Load Building and Merchandising Number

Electrical West

With which is consolidated the Journal of Electricity

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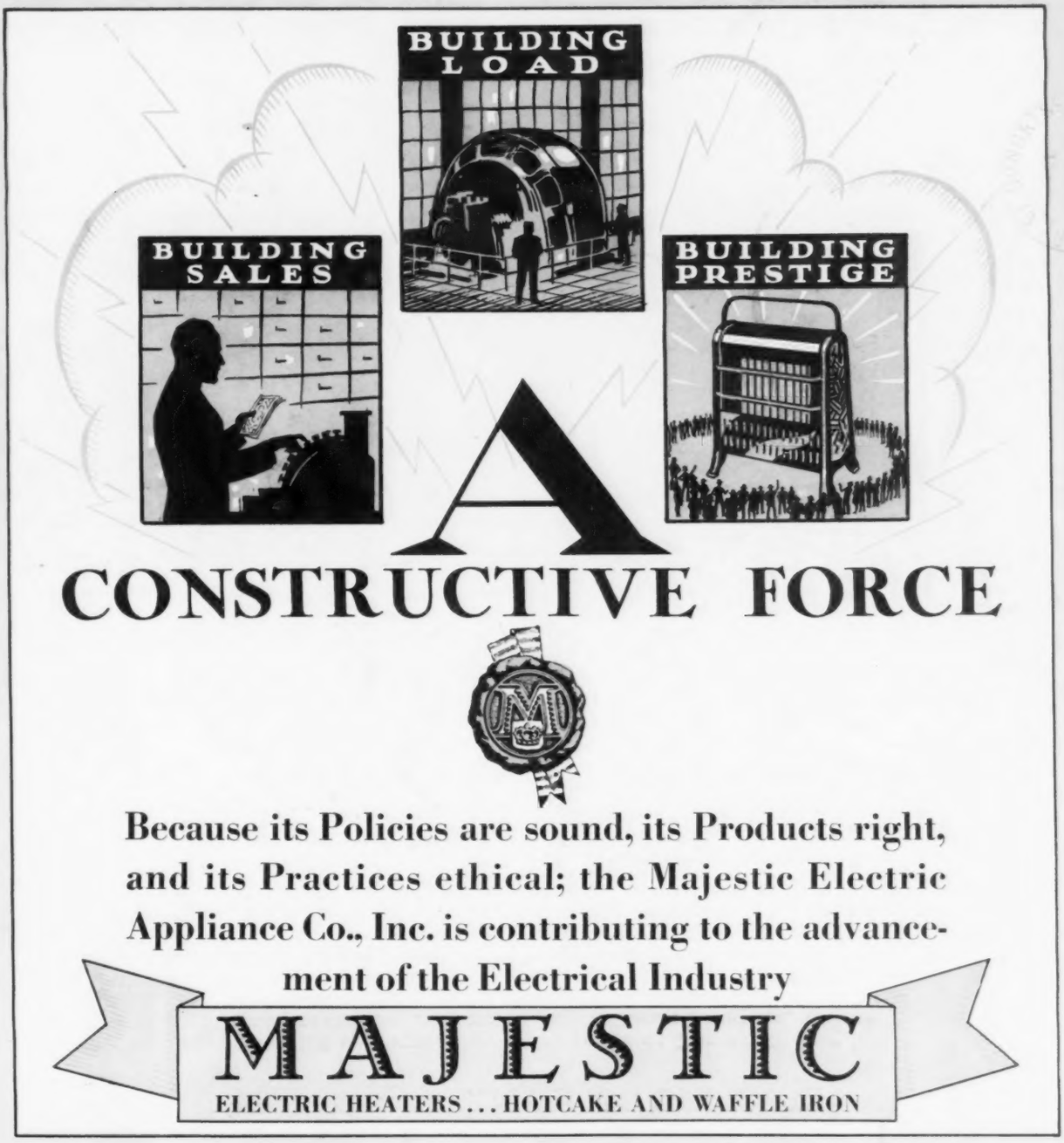
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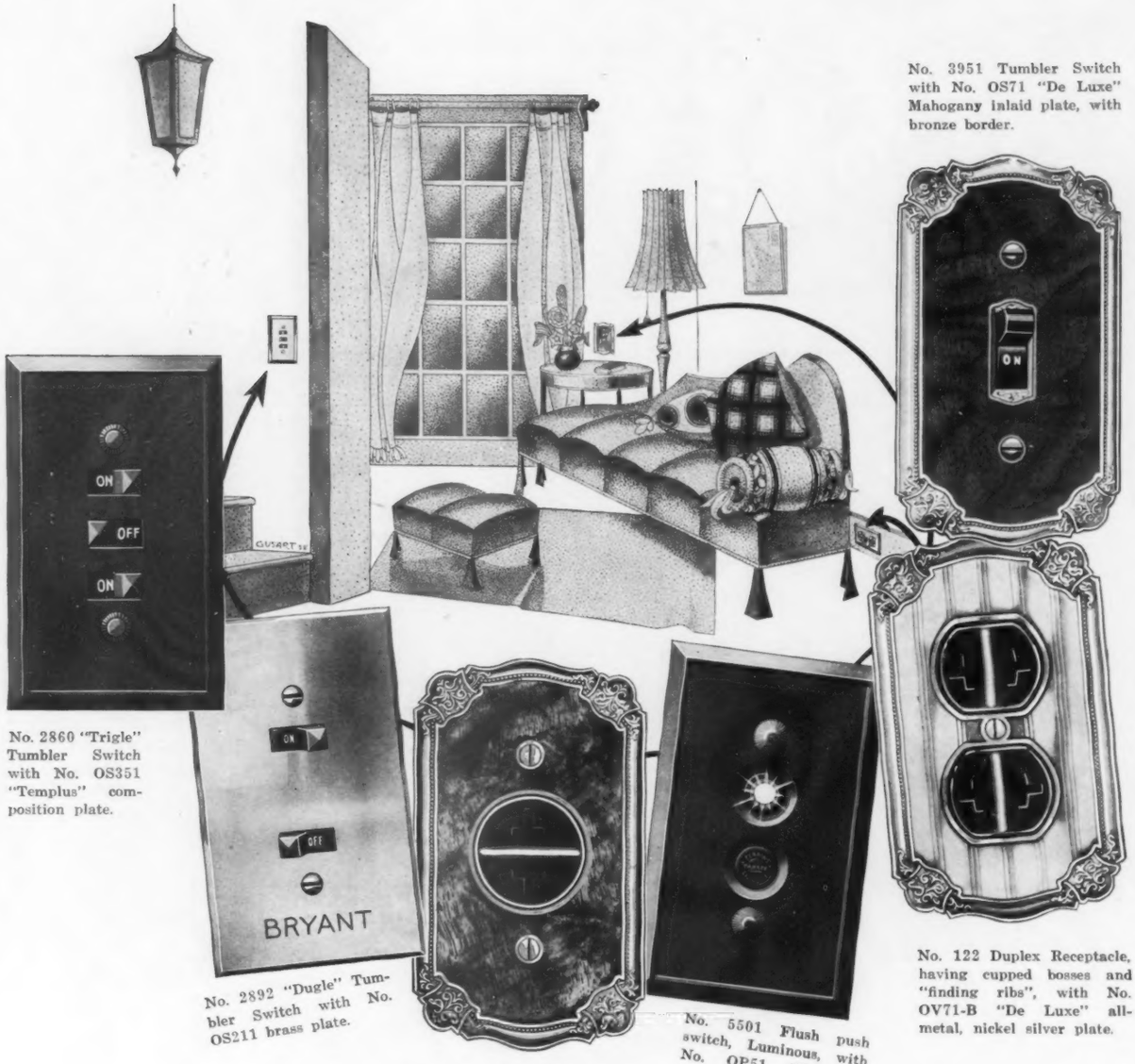

No. 3951 Tumbler Switch with No. OS71 "De Luxe" Mahogany inlaid plate, with bronze border.

No. 2860 "Trigle" Tumbler Switch with No. OS351 "Templus" composition plate.

No. 2892 "Dugle" Tumbler Switch with No. OS211 brass plate.

No. 760 Receptacle, with cupped boss and "finding rib", with No. OF71 "De Luxe" Circassian Walnut inlaid plate.

No. 5501 Flush push switch, Luminous, with No. OP51 "Templus" composition plate.

No. 122 Duplex Receptacle, having cupped bosses and "finding ribs", with No. OV71-B "De Luxe" all-metal, nickel silver plate.

this glimpse of a room corner

in a modern house shows Bryant switch and receptacle installation. The residence, office or factory, completely Bryant equipped, has wiring devices of reliability that assure long service and satisfaction.

"From left to right"-the devices shown above are: A "Trigle" switch, with "Templus" composition plate, controlling lights in hallway and porch; a "Dugle" switch with brass plate, for bedroom and closet; a single convenience receptacle, with "De Luxe" Circassian Walnut inlaid plate, for wall planel in dining room; a push button switch at the entrance to all bedrooms: a duplex convenience receptacle, with "De Luxe" all metal plate, two or three for each important room; and a tumbler switch with "De Luxe" mahogany inlaid plate, (indications on handle) for each entrance, hallways, dining room, library, living room, sun parlor, kitchen and basement.

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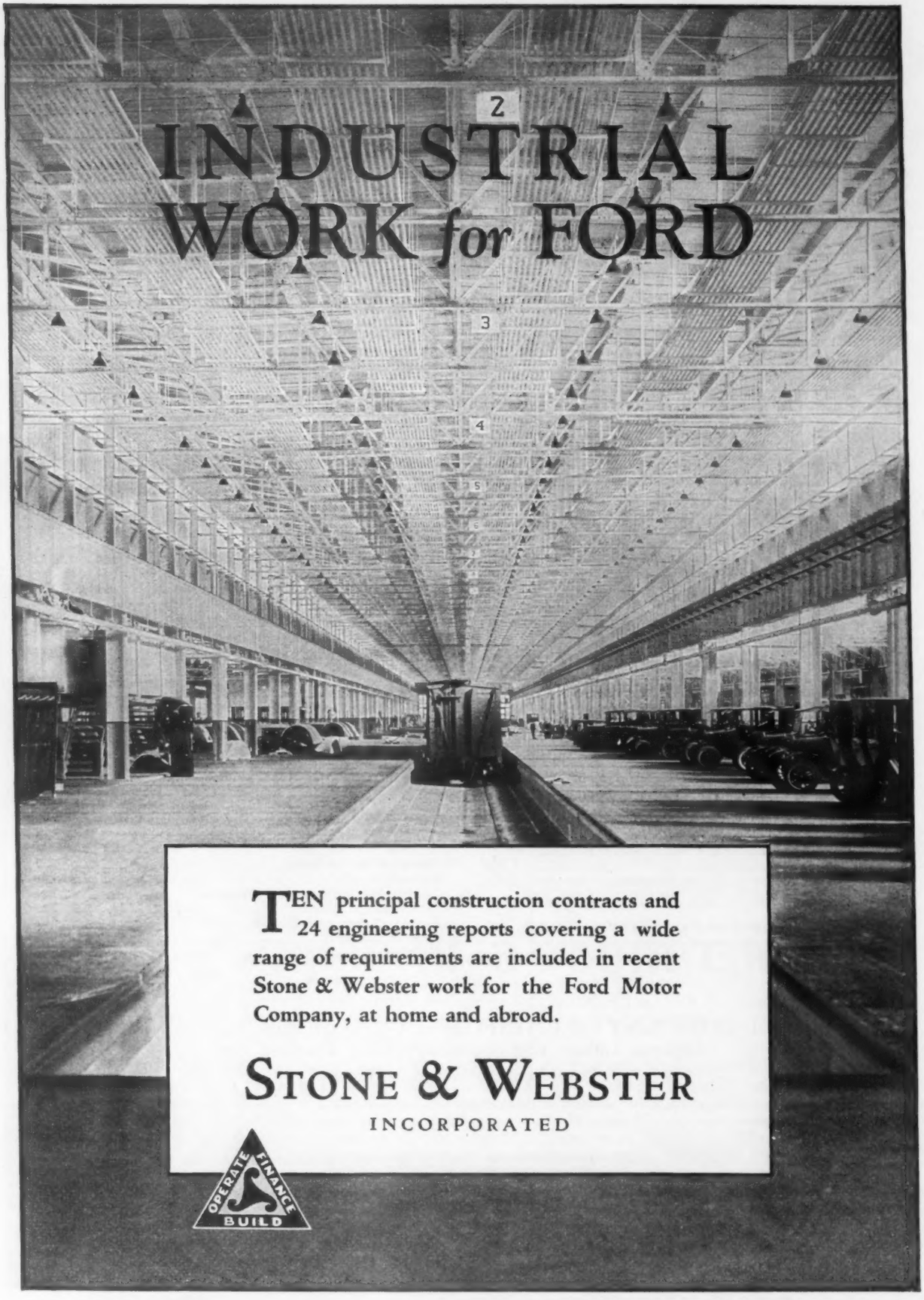
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C. T. HUTCHINSON, *Editorial Director* — A McGRAW-HILL PUBLICATION — G. C. TENNEY, *Managing Editor*

Volume 61 — San Francisco, October 1, 1928 — Number 4

Edison-Power Bureau Agreement Paves Way for Future Harmony

SUBSTITUTING co-operation for controversy, the Los Angeles Bureau of Power and Light and the Southern California Edison Company have adjusted amicably the differences that for more than six years have been the subject of discord and litigation. Unquestionably, the settlement of these old and irritating controversies redounds to the benefit of both the city power bureau and the Edison company.

Briefly, the points upon which a settlement were reached included the proposed construction of a steam plant by the city, the question of taxes paid by the Edison company during 1917-22, and that of billing the city for power purchased. The city will abandon the steam plant project and in return the Edison company will place one of the 35,000-kw. units in the Long Beach No. 2 steam plant at the complete disposal of the city for stand-by service. The Edison company agreed to pay certain taxes, and the city in turn acceded to the company's method of billing.

Credit for the settlement is due a Los Angeles attorney who acted as a private citizen in the interests of the people of the city. He deserves unstinted praise, while congratulations are due both the officials of the power bureau and those of the Edison company for the spirit of compromise which made it possible to achieve such satisfactory results.

That One More Kw.-hr. Per Domestic Consumer

AS A MARK to shoot at, one more kilowatt-hour per day per domestic consumer may loom as a large order. The commercial executive who stops to count on his fingers all the domestic consumers on his company's lines and to gasp at the seemingly impossible task of getting each one to increase daily consumption by one kilowatt-hour, may well pause.

Yet looking at it from the way it is done actually, the task is not at all infeasible. To add one kilowatt-hour per day per consumer is a matter of averages spread over the community. Just as an example, out of every 100 customers the sale of 15 ranges, 10 refrigerators, and 20 small appliances each of the toaster, cooker, waffle iron or percolator variety, a total of 80 smaller appliances, will achieve the much desired goal. No commercial manager feels stumped at that prospect.

Such a feat would result in only 15 per cent range saturation. To a number of companies, particularly in the Northwest, which sell ranges to 10 per cent of their domestic consumers per year, this would only represent an 18 months' job.

One Western company set for itself as a goal an increase of one hundred kilowatt-hours per domestic consumer for this year after getting from its accounting department the following summary of consumption averages for 1927, no small achievement in itself. Its annual kilowatt-hour consumption per consumer for domestic lighting only was 358 kw.-hr., and average revenue $27.24. The annual average for customers using electricity for lighting, heating and cooking was 4,262 kw.-hr., with average revenue for this class of $118.48. The annual average consumption of all domestic consumers—both classes enumerated above—was 642 kw.-hr.; the average revenue $33.28.

Moreover, its aggressive commercial campaign this year already shows indications that the addition of the required one hundred kilowatt-hours per domestic consumer will be realized.

In the mass, almost any commercial venture affecting the entire system of a power company will look formidable. The astute commercial executive, however, will refuse to be frightened by the apparent enormity of his task. He will integrate it—break it into bits. None of these bits is in itself formidable. Thus, while not losing sight of the mass objective, the task is done in its component parts and the accounting department, adding up the totals and dividing them into each other properly, can announce at the end of the year an advance along the entire front.

One more kilowatt-hour per domestic consumer per day should not be as difficult to attain as it may seem.

Invest in the Industry in Which You Earn Your Living

MEMBERS of the electrical industry who have surplus funds for investment should consider their own institutions as offering a real opportunity, rather than dabble in other enterprises of which they know little or nothing. There is probably no industrial field in the world today that offers so great an opportunity as the electrical field. There is stability, permanence, freedom from the menace of the synthetic competitor, and practically a universal field of application that has hardly been scratched. With a national average domestic consumption of only 400 kw.-hr. per year, it seems conservative to estimate a 100 per cent increase in the next ten years, with anything from 1,500 to 2,000 kw.-hr. as the probable ultimate. Is there any other industry that offers such a reasonable assurance of increased gross income in so short a time?

Central station executives, hitherto engrossed with the problems of finance, engineering and construction, are now turning to the active development of the commercial side. They have realized that they have something for sale, and they propose to sell it, make no mistake on that score. Readers of ELECTRICAL WEST have seen sales programs of the power companies develop into terms of seven figures for the active promotion of the increased use of electrical energy.

These ideas are not new. The trouble is, they are so familiar to the members of the electrical industry that they cease to excite any particular comment. How-

ever, why speculate, why gamble in securities that are far afield, when there are the securities of the power companies, the manufacturers of apparatus, appliances and supplies, about which we really know something, offering all of the desirable characteristics to the investor, with a future that seems so full of promise as to baffle prediction as to the ultimate outcome?

Those with funds to invest would do well to ponder over this suggestion. Don't speculate; don't buy on margin. Buy outright, put your securities in the safe deposit box, collect your dividends, and wait. In a few years, you will be surprised.

The Critics Answer Themselves

CRITICS of the electric light and power companies, through inferences and implications placed upon the testimony taken by the Federal Trade Commission, have accused the utilities of almost every crime on the calendar from unduly influencing the press to subsidizing school officials. Usually these critics have belonged to that class that believes implicitly in the doctrines of municipal ownership. Had municipal utilities been included in the scope of the Walsh resolution, we wonder how these critics would have explained the following excerpts from the 1927-28 annual report of the Public Ownership League of America as they were read into the record:

"A press service is prepared by the League and an ever increasing number of daily, weekly and monthly publications are using this and other publicity matter prepared by us. The Sacramento *Bee* and the McClatchy chain of dailies, the *Capital Times* of Madison, Wisconsin, and the *Leader* of Milwaukee are making constant use of our material and the Hearst papers have frequently used special articles on the editorial pages of their entire system. Labor publications have used our material freely, in some cases running a series of illustrated articles."

At this point in the reading an embarrassing question might be asked a League representative if the procedure followed during the investigation in examining other witnesses was carried out: "In using this material did the papers indicate its origin so that the readers would know that it came from a prejudiced and biased source?" At the same time the representative might explain the relationship between the League and the two radio stations that are broadcasting its message every week.

Another section of the report that would require considerable explanation is that referring to the "holding company" that the League is sponsoring as described in the following paragraph:

"After years of planning and effort we have finally succeeded in establishing a Public Investment Company with sufficient capital, financial backing and experience to guarantee security and success."

The self-appointed critics have had much to say regarding purported lobbying activities of the utilities in Washington. Yet in discussing the establishment of a Washington headquarters the League's report says:

"We have since tried to supply this need by arranging for some sort of a joint office and headquarters along with some of the progressive organizations that have their headquarters in Washington. But after much correspondence and a canvass of the whole situation it seems that none of these organizations feel willing or able to work with us in this way. There is nothing left, therefore, but for us to establish such an office and headquarters in Washington. We feel certain that such an office as the League will establish can be made to serve many progressive groups on many matters closely related to our work and thus be made not only a public ownership headquarters but a sort of people's lobby as well. At any rate we must have a Washington office and headquarters as quickly as possible."

Yet almost in the same breath one of the most vociferous of the industry's critics pays it an unwitting compliment from which a certain amount of satisfaction can be derived. In a recent statement regarding the Public Ownership League of America, Carl D. Thompson says, "In short we are undertaking to do for the municipal plants what the National Electric Light Association is doing for the private plants of the country."

It would appear from the printed record that the Municipal Ownership League of America itself has answered satisfactorily most of the criticisms that have been directed at the industry.

Oregon Fish Bills Meet Opposition

AN INTERESTING development in the pre-election excitement in Oregon was the recent formation of the "League in Opposition to the Water and Fish Bills," four bills initiated by sportsmen to close the Umpqua, Rogue, Mackenzie and Deschutes Rivers and their tributaries to further appropriation of water for commercial or municipal purposes. Of particular interest in this connection, however, was the fact that the movement to form this organized opposition came from the chambers of commerce of the state, headed by the Eugene Chamber of Commerce and the Eugene Water Board, which is building a hydro-electric development at the present time on the Mackenzie, and not from the power companies as the proponents of the measures expected. There was present at the organization meeting, in fact, only one representative of a power company, his presence being accounted for primarily by his individual interest in the subjects under discussion, as he has made elaborate studies of methods of getting spawning fish over dams and the fry down again without injury.

At the meeting, which was composed largely of representatives from chambers of commerce throughout the state, farmers' unions, and the like, with a few proponents of the measures, arguments were heard pro and con. At times it appeared that the bills were designed to keep the power companies from exploiting the state's water powers instead of to protect the game fish as the bills proclaim. In any event, the preponderance of the argument was to the effect that the bills as drawn were too drastic, and were inimical to the state's development.

One of the matters of particular interest to the electrical industry, brought up by the representatives from Eugene, was the refutation of certain charges made and implied by an editor of a sportsman's publication against the power interests. This editor, in an article in his publication discussing the merits of the measures, had written, "The power trust has served notice on *me* that it will spend a million dollars—or more if necessary—to defeat the water and fish bills," and had continued that this might account for the activities of the chambers of commerce in actively opposing the measures, leaving a very direct implication that some of the million dollars had already found its way into the coffers of the Eugene chamber. No less than three speakers representing the Eugene chamber and the Water Board of that city took occasion to brand this

charge as too ridiculous to warrant formal denial, and to reiterate Eugene's policy with regard to the development of power by municipalities, which is, in effect, that if a municipality cannot see its way clear to develop its own power, then it should encourage such development by an enterprising private company, for a municipality cannot progress without an adequate power supply to offer its prospective residents and business people.

At any rate, the formation of organized opposition to the measures is hailed by alert citizens as a necessary step, since it is always difficult to gage what an electorate will do under the influence of an emotional appeal such as will be made in support of the measures. Further, the auspices under which the league was formed, and the nature of its membership, will give to it far more prestige than if it were headed by the power interests, who would be accused simply of grinding another axe, with the effect of nullifying to some extent the league's efforts.

Portland Experiments With Retail Appliance Association

AN INTERESTING experiment is under way in Portland to endeavor to increase the sale of appliances and make possible the settlement of some of the difficulties that arise between power company merchandising departments and outside dealers. As is reported elsewhere in this issue, there has been formed an Electrical Appliance Retail Association, comprising the leading dealers, whose purpose is "to promote a better understanding between members, better co-operation between members and to increase the sale and use of current-consuming devices and incandescent lamps in this trade territory." The efforts of the association to date have been confined to a series of co-operative advertisements, chiefly on the subject of electric ranges. From a load-building standpoint, the primary interest in the organization logically rests with the Portland central stations.

From the standpoint of the power companies, the final test of the efficacy of the association will be whether or not the total number of ranges placed on their lines will show the expected increase from year to year, regardless of whether these ranges are sold by themselves or by outside dealers. From the standpoint of the dealers, however, the test will be whether it helps them increase their volume in ranges, thus yielding them increasing merchandising profits. The normal effect of such a trade association should be, it would seem, to produce both of these results, and yet from the available estimates of sales this year it does not appear to have had this effect.

Aside from a consideration of the economic factors, local and otherwise, influencing the volume done in electrical appliances, another factor that should not escape attention is, to put it as tritely as possible, that Rome was not built in a day. When it is considered that for ten years practically the only agencies through which ranges were sold in Portland were the two power companies, no one will suppose that any great percentage of the volume done in the city will be transferred to other agencies over night, or, in fact, in a year. In short, the outside dealers cannot expect to assume leadership in the range business of the city at once, nor can the power companies, in the interest of securing a satisfactory increase in domestic load annually, turn over entirely to the other dealers the job of merchandising their best domestic load-building appliance on the promotion of which they have spent volumes of effort and money over a long period of years.

Summarizing the advantages secured by the participants in the association that cannot be reduced to dollars and cents, it should be pointed out that the power companies, through their sponsorship, have opened the way for an understanding and solution of some of the dealer problems, the existence of which no one will deny. In view of the fact that the electrical industry is as peculiarly vulnerable to attack as it has been found to be, it would seem that any movement toward maintaining peace in the commercial family at no expense of commercial honor and prestige or volume of business is advantageous. The outside dealers, on the other hand, now have a medium through which to present a combined front toward securing the adoption of commercial policies that might seem advantageous to them. Some concessions have already been made to them since the formation of the association, as for instance the discontinuance of offering premiums or cutting prices during campaigns, and other matters can be taken up as they arise with more chance of a satisfactory outcome than if there were no authoritative body through which to deal.

This latest experiment in Portland will bear watching. If it is successful, and many opine that it is already working out advantageously, it may result in a plan that will find general application.

Selecting Appliances for Sale to Consumers

IN THE present-day highly competitive market, with drug stores and the red-front 5, 10 and 15-cent emporiums in the electrical appliance business, there are certain rules governing the purchase of appliances that are worth reviewing. For the electrical dealer or the power company appliance sales manager who is charged with selecting the lines that he is to merchandise, four general principles should be borne in mind.

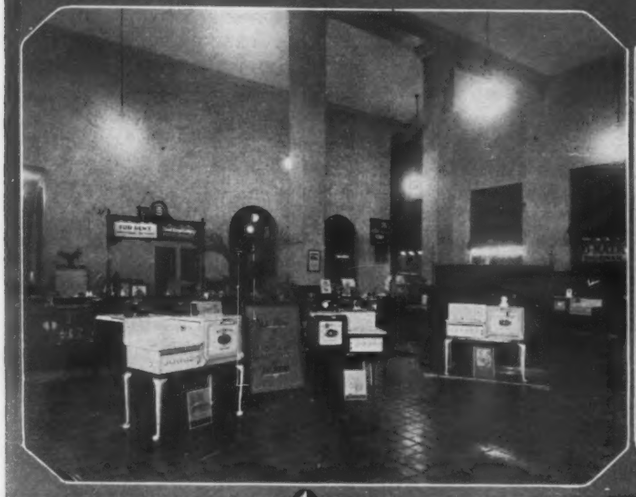
The first is salability. Does the appliance meet an existing or latent need? Is it pleasing in appearance? Is it reasonably priced in terms of the service it is designed to render? Does it carry a name that enjoys consumer acceptance? If the answer to all of these questions is in the affirmative, then certainly the first criterion is met.

Then there is the question of the stability of the manufacturer. Is his reputation good? Can his guarantee be relied upon should the appliance or device fail? Will he be in business throughout the life of the appliance so that repair parts will be available? These are important questions.

Also the policies of the manufacturer should be considered seriously. What is he doing to assist in the sale of the appliance to the public? Does he advertise extensively? Does he provide suitable sales helps? Does his interest end when the order is secured? Successful selling depends upon the right answer to these questions.

Finally, there is the matter of quality. One question will serve to determine this important item. Will the device render good, efficient service?

Naturally all of these principles are based upon the one requisite of service to the consumer. If such appliances as are purchased successfully meet these tests, then the dealer or central station need never worry about complaints from customers for satisfactory merchandise is assured.



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Effective Appliance Displays

PROBABLY the most attractive department store of electrical appliances is the new salesroom in the Public Service Bldg., Portland, in which the Northwestern Electric Company's offices are located. The electric sales here are conducted by this company. (1) A range display on the floor in front of the Taylor St. entrance. (2) The main display and sales floor, showing the center show case. The Taylor St. entrance is on the right. (3) An illuminated fountain in the Taylor St. entrance. Show windows flank this entrance on either side. (4) A large window on the corner of Sixth and Taylor Sts., from the Sixth St. side. (5) Another show window on the Sixth St. side. Windows on all three sides of this building are available for unusually attractive displays of electrical merchandise of all kinds.

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Displaying Appliances *to* Create More Sales

THE finest appliance display to come to the attention of ELECTRICAL WEST is here described in word and picture. The Northwestern Electric Company, Portland, in its new home in the Public Service Building, has demonstrated that the electric store can be made as attractive as any store in the city, and that investment to make it so is returned with interest.

THREE prime considerations influenced the Northwestern Electric Company, Portland, to outfit one of the finest electric appliance display rooms on the Pacific Coast, if not in the entire country, at the time the company moved into its new quarters in the Public Service Building last December. These considerations, in increasing order of their importance, were to install a model sales room, with particular reference to the lighting, which could be pointed to by lighting salesmen as an example of how attractive a retail store can be made by modern lighting effects; to assume leadership in creating a truly fine commercial establishment, which would be a credit to the city and thus exert a favorable public relations influence; and to influence the volume of sales in appliances through displaying these appliances in the most attractive manner and under the most pleasing circumstances possible to devise.

Little need he said as to how well the first two functions of the new sales room have fulfilled their purpose. It is easy to imagine a commercial lighting prospect becoming enthusiastic over his own prospective installation and being willing to raise his ante above his first preconceived notion of what constituted good lighting after seeing the marvelous effect created by the 26-in. specially-built Ivanhoe units, containing 1,500 watts each, delivering 22 foot-candles at table height in the main display space. On the second point, suffice it to say that commendation of the enterprise of the company has been voiced on all sides, and an example of the room's civic usefulness was evidenced during the last Rose Festival when it was used for a public reception to Queen Elise and her court. What we are concerned with at present is embodied in the question, "Will this display pay its way with increased appliance sales and thus build load at no cost?" While conclusive proof cannot be produced from comparable figures, because the company was not merchandising a complete line of appliances prior to moving to the new building, the answer of company officials, who have watched the results of buying in the new store to date, is emphatically, "Yes."

PHYSICAL CHARACTERISTICS OF THE MAIN SALES FLOOR

The Public Service Building was built to house three associated utility companies in Portland, the Portland Gas & Coke Company, the Northwestern Electric Company and the Pacific Power & Light Company. The latter doing no business in the City of Portland occupies no ground-floor space, and so it is allotted to the other two. The building extends for a full block 200 ft. on Sixth St., between Taylor and Salmon, and is 100 ft. deep. The main entrance with its lobby and elevators occupies 50 ft. frontage toward the west on Sixth St., and about one-half the building's depth, so that the balance of the ground floor comprises a large U-shaped room having wide wings on each end and a narrow connecting base. This room is divided equally between the Gas company on the south, or Salmon St. end, and the Northwestern company on the north, or Taylor St. end. Each company maintains its cashiers' cages, service application desks and similar services behind a long marble counter extending nearly the entire length of the room at the rear, and its retail store in the large square portions of the room at either end of the building.

In the case of the Northwestern company this space, practically 75 x 100 ft., is flanked by show windows on the Sixth and Taylor Sts. sides. Allowing for the street entrance from Taylor St. and for the space taken up by the building pilasters, there is a total of 140 linear ft. of window display space. In the far rear corner of the main display space is a slightly raised elevation occupied by salesmen's desks, and carrying the administration force and equipment of the appliance sales department. These deductions from the total space leave approximately 5,000 sq.ft. of effective space for floor display.

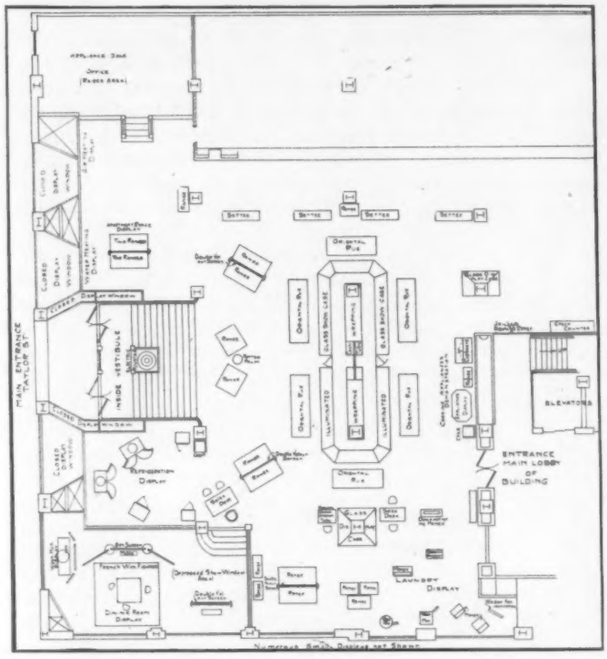
Being flanked on the north end and the rear by an overhanging mezzanine balcony, the room has two ceiling elevations, With red tile floor, light tan plastered walls without figured decoration, and with structural columns, finished like the walls and likewise without embellishment, the room gives at once an impression of dignified stability without lavishness. Glass show cases with walnut trim, walnut desks and appliance tables, velour hangings used in connection with range and refrigerator displays, oriental rugs, an illuminated sign over the center show case, potted palms and cut flowers in season, and an occasional colored display card, plus a tasteful grouping of the larger

appliances on display, make a very pleasing ensemble from an æsthetic standpoint. An illuminated fountain, on the steet level just inside the Taylor St. entrance, and built into the stairway rising to the level of the main floor, furnishes an inviting decoration. Between the street door and the stair this entrance is faced on either side with small show windows.

Sales Floor Display

Occupying the approximate center of the main display space is a 22-in.-wide show case designed in the form of a hollow rectangle, 33 ft. long and 11 ft. wide, outside measurement. In its glassed-in, specially lighted compartments are display lamps, hollow ware and smaller household appliances. This attractive piece of furniture is equipped with a wrapping counter and a cashier's stand, and all cash transactions are closed at this point. Floor salesmen's desks and appliance display tables are placed at strategic points about the room, and are moved when it is necessary to fit them into the changing displays.

The rest of the room is devoted to the display of the larger appliances,—ranges, water heaters, refrigerators, air heaters, washing machines, ironers and vacuum cleaners, which by ingenious grouping in bays and alcoves marked off by the structural columns are set off from each other so that the customer interested in ranges is not confused by the proximity of refrigerators or other appliances. A clever device for facilitating the display of ranges is a movable background of richly colored velour, hung from an attractive wrought iron stand. These backgrounds are of different colors so that any desired combination of range and background can be secured. Ranges are displayed back to back with the velour drape between, so that when a prospect stands in front of one range his attention is concentrated on it to the exclusion of all other merchandise. These backgrounds are also used in connection with window displays. As has been indicated above, the displays are shifted frequently to lend a freshness to the decorative scheme, as much for its favorable effect upon the salesmen as to interest the customers who periodically visit the company on some business or other.



Floor plan and arrangement of appliance sales and display section of the Northwestern Electric Company in the Public Service Building, Portland.

Window Displays

Generally speaking, the four windows on the Taylor St. side and the two windows in the entrance are used for displaying lamps and smaller devices. These windows are enclosed with a peneled walnut background to help bring out the bright finishes of the merchandise. The larger appliances are displayed in the five Sixth St. windows, which open into the salesroom. A large window on the corner of Sixth and Taylor, sunk below the level of the sales floor, can be used to simulate any room in the home and can be furnished with the appliances suitable to such room. Wax figures of a man, woman and children have been used to represent the family at home in living room, dining room or kitchen surrounded by electrical conveniences pertinent to the setting used. Stands, pedestals, drapes, cut-outs and other window dressing devices are used in all displays. Trims are changed weekly and the windows are rotated so that a new display appears every few days. Window trims are made to tie in with newspaper and other advertising done by the company, particularly at times when some appliance is being campaigned.

Specially-designed window lighting equipment, as well as the lighting in the main display room, was described in an article in Electrical West, April 1, 1928, p. 226.

Salesroom Staff

The regular salesroom staff, reporting to the appliance sales manager, consists of the following: a floor sales supervisor, a salesman behind the counter, a woman on demonstration and sales, a window decorator, who likewise takes care of the arrangement of the floor display and spends about half her time selling, and a stock man, who keeps the display appliances in order and who also acts as a junior salesman. In addition to these regulars the staff is daily augmented by two specialty men, an outside range salesman and one man from the laundry division being delegated to duty on the sales floor. The men work in rotation on this duty being assigned on a regular schedule which brings them into the store approximately one day a week. Also a woman, devoting most of her time to outside range demonstrations, conducts a demonstration of electric cooking at the store every Wednesday afternoon. To complete the list, it should be mentioned that the office force of the appliance sales department fills in on the floor during the noon hours so that the floor force is never badly depleted during the eight-hour day.

Results

As has been stated, no comparable figures on appliance sales are available to prove conclusively that the attractive display in the Public Service Building has been responsible for a large increase, since the company did not attempt to merchandise a complete line at its old location in the Pittock Block. Dollars and cents results during the first seven months of the year, however, have been quite saitsfactory to company officials. The department is charged with rent, based on space occupied, of an amount more than twice that charged in the old location. In addition, the expense of maintaining the store has increased materially as has the interest on the greater investment in display furniture and fixtures. In the face of these increases in expense, the department has been able to show a profit in some months when it was expected that this might not be possible the first year. In addition to the merchandising profit phase of the venture, it is recognized that the increased sale of appliances from the floor has helped build satisfactory load on the company's line.

At a Fourth of July parade in San Luis Obispo Clines Electric Shop, assisted by the Valley Electrical Supply Company, entered this unusual prize winning display.

Through the Dealer With

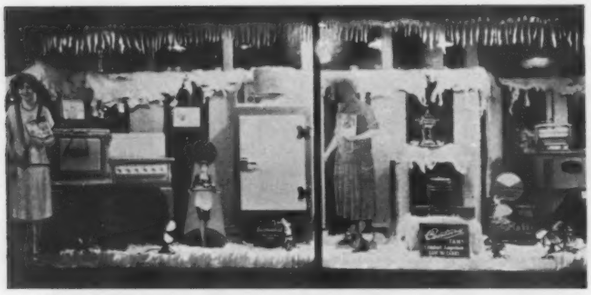
Refrigeration

EITHER it will work or it will not—that much can be said of any principle. In mathematics, if the principle is sound it will be possible to solve with it other and more complex problems. In economics—which is a high sounding term applied to the art of buying and selling—no less should be expected.

In the experience of the Valley Electrical Supply Company, Fresno, the principle of selling electrical appliances through the dealer has been demonstrated sound over five years of hard sledding. The going has been hard in the agricultural district in which the entire San Joaquin Light & Power Corporation operates, and for which the Valley Electrical Supply Company is its merchandising subsidiary. The entire valley has suffered more than usually from low crop returns and demoralized farming conditions. Yet despite this condition the kilowatt-hour-per-domestic-consumer sales have mounted steadily. Electrical appliances have continued to go on the lines in such numbers as not only to compensate for other losses but to add materially to company connected load.

That dealers, properly organized and stimulated, can make a first-class selling organization for the central station in merchandising refrigerators has been demonstrated by that champion of through-the-dealer merchandising, the Valley Electrical Supply Company of Fresno.

Through-the-dealer merchandising of ranges, water and air heaters, and current-consuming smaller appliances, has been described in these columns many times. (See *Journal of Electricity*, Oct. 1, 1926, p. 271; ELECTRICAL WEST, October, 1927, p. 192; *Electrical Merchandising*, August, 1928, p. 760; *Electrical World*, Sept. 15, 1928, p. 519.) Its soundness is attested to by the evidence of sales, kilowatt-



A hardware dealer co-operating agent features the refrigerator among the other heavy duty appliances in an attractive window display.

hour consumption, harmonious and enthusiastic dealer relations, public approval and leadership enjoyed by the power company in its territory.

But whether the principle would work in the sale of electric refrigeration, to use mathematical parlance, was yet to be proved. Doubt existed in the mind of the manufacturer that it would prove as good a method of selling as the establishment of branch stores.

To H. H. Courtright, manager of the Valley Electrical Supply Company, whose life work has been the development of this co-operative dealer sales plan, the idea of establishing branch stores as outlets for refrigerators was uneconomic. "Our success in other merchandising activities by means of our 'Through the Dealer Sales Plan' warranted the continuance of these same policies in this activity," he declared.

These dealers had proved capable of doing the job in other lines. Furthermore, Mr. Courtright felt that in the small town in which he operates the dealer is much better known, better acquainted with his people, more trusted and more permanent than any salesman who could be put in that town to run a branch store. The personal touch, worth so much in selling, would not be there.

"Ten commandments" of refrigeration selling are set forth by Mr. Courtright in outlining the selling program in which 36 dealers in his territory act as distribution agents, each with his own sales force and co-operating dealers also.

During the first few pioneering years of electric refrigeration the Valley Electrical Supply Company merely marked time, selling only from its own floor. Last year, however, it felt satisfied that many of the "bugs" had been taken out of the machines, that dealers could not go wrong in handling them, that servicing had been reduced to a minimum, and that the merchandise could now be offered without apologies. It was decided, therefore, to campaign electric refrigeration actively.

This company secured the distribution of a well known make of electric refrigerator for the entire San Joaquin Valley, a territory embracing in addition to that served by the San Joaquin Light & Power Corporation and Midland Counties Public Service Corporation two counties served by another company. The plan of operation, following the "Through-the-Dealer" principles, is simple enough.

To get complete representation 36 of the most progressive and energetic dealers in the territory were selected as direct agents, each operating in an exclusive territory. In this territory, if he desired—and many of them made effective use of the opportunity to pass the co-operative method on to their fellow dealers in their territory—any one of these 36 dealer agents could appoint sub-dealers.

"In our presentation of this sales activity to our dealers," says Mr. Courtright, "we firmly insisted that we were entirely serious in its being followed through in its entirety. Upon local conditions and size of territory alone depended our requirements as to display stock. An assurance of real activity was required before any dealer could qualify as a dealer.

"These dealers were given a monthly and yearly quota to work to. This quota was based on 3.1 per cent of the total Curtis publications' circulation in each territory, divided as to per centage as follows:

January,	3 per cent	May,	14 per cent	September,	6 per cent
February,	5 per cent	June,	12 per cent	October,	5 per cent
March,	12 per cent	July,	11 per cent	November,	5 per cent
April,	14 per cent	August,	7 per cent	December,	6 per cent

"We were certain in our calculations that in each instance where a dealer's sales reached his quota requirements his endeavor would prove profitable to him. This has since become a fact.

"It was outlined to the dealers that, in addition to having a sufficient display stock, it would be necessary for them to display refrigerators properly not only in their windows but on their floors as well. They must make proper use of display material supplied, distribute sufficient quantities of sales literature, tying these efforts together with proper newspaper advertising, copy for which we supplied, as well as inaugurate direct-mail campaigns and develop a large enough sales organization whose efforts would be confined exclusively to refrigeration sales."

Dealers selected jumped at the opportunity thus presented. Among such dealers were not only electrical dealers but hardware, furniture and department stores. When the agreement between them had been consummated each dealer was sent a letter, as follows, setting forth his definite quota:

GENTLEMEN:

The following quotas constitute the minimum number of General Electric refrigerators you are expected to sell during 1928:

January	1	July	3
February	2	August	2
March	2	September	1
April	3	October	1
May	4	November	1
June	3	December	1
Total			24

Start out by meeting your January quota in January and so on during the year, then, when you review your efforts at the close of 1928 you can look upon them with that degree of satisfaction that comes with a work well done.

Let's go—*now*.

To stimulate dealer interest and keep their efforts at the highest pitch, large dealer meetings were held whenever some important personage from the manufacturer was in the vicinity. Thus each meeting was an occasion of great interest. Rather than small frequent meetings Mr. Courtright prefers to go directly to the dealer's store and go over details with him there, or call a small meeting there to which the agent-dealer gathers his sub-dealers and sales force.

Field representatives cover the territory to keep contact, give information as to the product, iron out difficulties, make minor adjustments, and complete sales which the dealer, for some reason, cannot close. A combined service man and salesman tours the territory once or twice a month doing nothing else.

The refrigeration staff of the Valley Electrical Supply Company at central office consists of ten salesmen and a supervisor, and two service men. Eight of these salesmen operate from the Fresno store and two from the Bakersfield store. The service men are sent out on call immediately to any part of the system.

Unusually friendly relations exist between the dealers and the company. Sales letters, sales training helps, bulletins and other pep-up literature keep all dealers in step with the campaign as with any good sales organization. Two other features of the co-operative plan have cemented the organization more closely together.

The first of these is that any prospect who comes into a dealer's store, whether living in his territory or not, may be sold. For this the dealer making the sale gets 10 per cent commission on sales made for another dealer. Thus all dealers work together.

Another is that any dealer may send his prospects to the main stores of the Valley Electrical Supply Company where a full display of all models is maintained, thus not making it necessary to carry the financial burden of the entire line tied

up in display on his own floor. Such prospects are protected to the dealer. In fact, evening appointments are made whereby a dealer may bring his prospects to Fresno, take in a show with them, and have a special visit to the refrigeration display under the most auspicious circumstances.

Every means of co-operation possible, first determined to be practical, is given dealers. An example of this is given in the occasion of a Fourth of July parade at San Luis Obispo, in which A. V. Cline, progressive dealer, proprietor of Clines Electric Shop, wished to enter a float on refrigeration.

J. U. Berry, advertising manager for the Valley Electrical Supply Company, went to San Luis Obispo and directed and assisted in the building of a most unique parade feature, illustrated at the head of this story. A portable hotel model refrigerator on wheels was fitted with a pair of shafts. Mr. Cline's two sons were placed between the shafts and were driven by his small daughter who was seated atop the characteristic General Electric unit, using red, white and blue ribbons for reins. Following her were four members of the sales force who carried reproductions of the larger models fashioned out of wallboard. Each side and back of these "walking cabinets" was lettered with a sales message, each different, telling the predominating merits of the product and the various benefits to be derived from its use.

Results Clinch the Argument

So much for the theory and the method. Did results justify Mr. Courtright's contention that the "Through-the-Dealer" selling could do the job best? The plan has been operating for eight months now, enough time to show which way the wind blows.

"That this co-operative effort is productive of results," says Mr. Courtright, "is shown in the following percentages of sales against quota:

Jan.,	133 per cent	March,	114 per cent	May,	208 per cent
Feb.,	187 per cent	April	145 per cent	June,	*97 1/3 per cent

(*The manufacturer was unable to keep up with deliveries to this territory due to sales demand. This resulted in a falling off in sales due to inability to supply machines to buyers. Indications at the time pointed to equaling of May sales at the time of the shortage with good possibilities of attaining the year's maximum quota before the 15th of July.)

"On a survey of our dealer sales we find that all but six reached their quota requirements. The highest percentage made by a dealer was 248 per cent of his quota. Of the six who failed to reach their quotas the lowest made 67 per cent of his quota."

It will be interesting to note that the minimum quota set by the manufacturer for the entire territory was 560 machines for the year. The maximum quota was set at 1,000 machines. Last advices, Sept. 1, reported total sales for the year of 840 machines, despite shortage of supply.

The story might well end here, with such evidences of the success of the principle in practice. But this story would not be complete without a brief summary of the ten selling principles for refrigeration with which Mr. Courtright has inspired all of his dealers.

A New "Ten Commandments"

1. Have a Woman in the Store. A woman in a store, to dress it up, make it attractive, wait on women customers and display appliances—especially refrigerators—is a definite asset.

2. Color in Display. Liven up the display. Without a touch of color here and there nothing is so cold and vault-like as a display of refrigerators.

3. Cleanliness. The whole refrigerator idea is one of cleanliness. Make the refrigerator display spotlessly clean.

4. Take Advantage of Fairs and Parades. There is no better time to sell refrigerators than at a fair, when people who have been interested but never quite convinced come in a receptive mood to look over and decide on a model.

5. Make Clean Delivery of the Machine. Always see to it that enough men go out with a refrigerator to carry it in easily, gently, and with due respect.

6. First Impressions. See that ice trays are scoured out before delivery, filled and frozen, and a frozen dessert prepared in another tray and all delivered by a salesman immediately after the truck delivers the refrigerator, thus providing the family with ice cubes and dessert enough for even the neighbors. (See Electrical West, July, 1928, p. 38).

VALLEY ELECTRICAL
Fresno, California, January 30, 1928.
TO ALL DEALERS:
On March first the General Electric Company will release a crackerjack direct mail campaign for Spring. It is now well along in preparation, and we know that you are going to like it.
The value of this campaign to you is going to depend largely on the kind of mailing lists to which it is sent.
Right now is none too early to get your mailing lists in shape and we cannot too strongly urge the importance of having yours revised and up-to-date.
Mailing list forms for the new campaign will be sent out on March first.
Please get your new prospect lists in shape so that you can quickly list them on the new mailing list forms when they are sent to you.. Please get started on this right now.
Cordially yours,
VALLEY ELECTRICAL SUPPLY CO.
Refrigeration Sales.
VALLEY ELECTRICAL
Fresno, California, March 1, 1928.
TO ALL DEALERS:
Gentlemen:-
"HONOR ROLL"
The following are the list of dealers who have reached ONE HUNDRED or more of their quota.
This list will be forwarded at the beginning of each month and will be designated as "The Honor Roll."
Abbott's Electric Shop
Cline's Electric Shop
Cross Horlock Company
H.M. & M. Service Co., Inc.
Glassford Hardware Co.
Herring Electric
Jensen Brothers
Jones Hardware Co.
Kutner-Goldstein Co.
Magnuson's Store, Inc.
A. P. May Co., Inc.
Nance Creamery & Con. Co.
Very Cordially,
VALLEY ELECTRICAL SUPPLY CO.
Milk Held at
Relative Growth of One Bacterium
50° F. 1 1.2 1.5 4.1 6.2
68° F. 1 1.7 24.2 6,128. 357,488.
It is so hard to win back, Once it is lost—
Don't Economize on Health
PLENTY of sunshine, exercise and good food, is all the average person in California needs to ensure radiant health.
Sunshine and exercise are free as the air. Good food, too, is easy to obtain. But it is important that food be kept good after it is purchased. Look at the chart above and see how quickly milk spoils at 68°. In just a few hours it is unfit for use. Yet if kept in a General Electric it is perfectly wholesome even after a week or ten days.
Meats also must be kept at temperatures below 50°. Why not test the temperature of your refrigerator some warm day? We will lend you a very accurate thermometer if you wish. Most people will be surprised to learn that on a warm day the temperature of their refrigerators is above 60°.
But not a General Electric. Its temperature is constantly well below 50°, no matter how warm the day. And the air inside is always dry, thus preventing mold.
Visit one of the stores listed below. Learn all about the health features of the General Electric. Make this lifetime investment in healthful, sensible living. Enjoy all the other conveniences which a General Electric brings.
GENERAL ELECTRIC
Refrigerator
Easy to Own:
The model illustrated in this advertisement requires only a small down payment, and then twelve monthly installments. It is the finest cabinet of its type which can be made—full porcelain lined including freezing unit, ebonized door molding, automatic knob, many other features. Plan to see it!
VALLEY ELECTRICAL SUPPLY CO.
Refrigeration Department Open Evenings Until 9 o'Clock
General Electrics May Be Purchased From the Following Dealers:
FRESNO
BAKERSFIELD

Two typical stimulating letters sent all co-operating dealer agents (*above*) and one of the large advertisements featuring dealer outlets.

7. Instruction in Correct Use. Be sure that the housewife is thoroughly instructed in the proper use and care of the new refrigerator. It will save trouble calls.

8. Follow Up the Sale. Don't consider the deal closed after the refrigerator has been installed.

9. Develop Prospects Among Friends of Purchasers. Probably no finer prospects for future sales are obtainable than through satisfied customers.

10. Get Out in the Field. The live dealer of today realizes that he can no longer just sit and wait for sales to come into his store. Reliable statistics show that of all sales made today in retail selling only 40 per cent are made over the counter. That means that 60 per cent are made outside.

They're 16,000 strong
Every morning 16,000 Portland housewives turn on at least 16,000 switches on 16,000 electric ranges, and 16,000 good husbands get breakfasts fit for kings!
This is just another way of saying that there are 16,000 "budget-keepers" in Portland who KNOW what Electrical Cooking has done to speed up and lighten kitchen tasks; who have learned thru monthly expense audits that the electric range has the lowest average of all operating costs.
CONTROLLED HEAT is the secret. Speedy, but with not an atom of waste. Each unit has a specific work to do and does it. Clean heat; temperature kept equalized by thermostatic control; NO ODOR! All are reasons why electric ranges are fast replacing obsolete models and methods.
We invite Portland women not using electric range convenience, to investigate NOW! Every dealer listed is prepared to demonstrate and deliver the range of your choice!
About Payment—
A small payment delivers a new electric range. Connect to your wiring and demonstration FREE!
The local electric light and power companies approve and service these modern electric ranges
Operating Cost—
The average monthly operating cost, (including light, electric range and appliances), taken from the actual figures of 16,000 Portland users is
$4.79
Ira F. Powers Furniture Co.
Stubbs Electric Co.
Edwards Furniture Co.
Gevurtz Furniture Co.
Meier & Frank Co.
Portland Electric Power Co.
This is ELECTRIC RANGE Month
Paul Schatz Furniture Co.
Watson-Stiff Furniture Co.
Wm. Gadsby & Sons
Henry Jenning & Sons
Olds, Wortman & King
Northwestern Electric Co.
Investigate Electrical Cooking—See these Dealers' Windows!

Two power companies and ten dealers in Portland spent $1,550 in newspaper advertising discussing electric ranges. This co-operative advertising was one of the accomplishments of the Electrical Appliance Retail Association.

Let's dispose of this "High Price" myth ...of the electric range!
Many jealous guardians of the family budget book have longed for the convenience, economy and cleanliness of the electric range; but the "High Price" bugaboo has kept them from purchasing—or *even investigating.*
As a short cut to the actual truth about electric range prices, Portland dealers have dedicated the following to these housewives:
1. There is an electric range for every purse, fitting your needs, at a price you can afford.
2. A small down-payment will deliver the range of your choice. The balance to suit your convenience.
3. Connection to your wiring and instruction is free.
4. New, modern electric ranges are priced from $75. to $300.
Investigate NOW.... talk your range problem over with any dealer listed. Specific information and suggestions will be made. Start during Spring cleaning time to enjoy the comforts of electrical cooking.
The local electric light and power companies approve and service these modern electric ranges
OPERATING COST—
The average monthly operating cost, (including light, electric range and appliances), taken from the actual figures of 16,000 users is only
$4.79
Meier & Frank Co.
Paul Schatz Furniture Co.
Watson-Stiff Furniture Co.
Edwards Furniture Co.
Gevurtz Furniture Co., Inc.
Portland Electric Power Co.
This is ELECTRIC RANGE Month
Olds, Wortman & King
Ira F. Powers Furniture Co.
Stubbs Electric Co.
Wm. Gadsby & Sons
Henry Jenning & Sons
Northwestern Electric Co.
Investigate Electrical Cooking ••• See these Dealers' Windows

Co-operating to Sell

AN INTERESTING experiment was tried in Portland early this year in an endeavor to increase the sale of appliances, particularly ranges, in the territory, and to make possible the ironing out of some of the difficulties that always exist between the power companies and outside dealers. This experiment took the form of an association of the leading dealers, the organization and activities of which are here told, with an analysis of results and advantages.

PREDICATED on the theory that if all the firms in a trade territory selling electrical appliances did so under somewhat similar merchandising policies and with an understanding and co-operation between them, the total volume in that territory should be greater and the individual profits larger, an "Electrical Appliance Retail Association" was formed in Portland early in 1928. Fathered by the Portland Electric Power Company, whose general sales manager, A. C. McMicken, conceived the idea that the net results of co-operation should be advantageous to all concerned, and joined in by the Northwestern Electric Company, a meeting of the leading electrical dealers of Portland was held Feb. 15, 1928, at which a form of organization was adopted and officers elected.

Prior to this meeting the principal firms selling electrical appliances, which it was thought might be interested in such a movement, had been invited to dinner by the Portland Electric Power Company. At this dinner the idea back of the movement and the reasons for co-operating were given expression. So well was the proposition received by those present that immediate plans were made by which the association was to be effected. An interesting sidelight on this meeting was the fact that the individuals present, who nearly all held important positions as department heads in their respective firms, were very largely strangers to each other personally.

At the organization meeting immediately following the dinner meeting there were represented beside the two power companies five department stores, eight furnitur stores, six electrical contractor-dealers, and one specialty appliance store, making a total of 22 appliance merchandisers. Not one dealer of any consequence in the city was absent, so that the percentage of the potential selling effort represented was very high. Since that time the specialty store has dropped out of the organization leaving 21 members active and functioning at the present time.

Co-operative Advertising

Immediately after organizing, the association laid plans for some co-operative newspaper advertising on electrical appliances tying in with national monthly campaigns. There was little time left in February to do much with waffle iron advertising, but campaigns were arranged on toasters in March, percolators in April and ranges in May. The flexibility of the organization permits any number of the members who so desire to enter into such campaigns, and this year found fifteen co-operating in the small appliance advertising and twelve on ranges. In each case a series of advertisments on the general use of the appliance fea-

Electric Appliances

tured was prepared by a local agency, and made up to carry the names of all the firms contributing to the campaign. Obviously no specific make of appliance was mentioned, it being necessary for each individual firm to supplement the co-operative advertising with that of its own in order to bring out what makes of appliances it was selling and the particular merits of those makes.

The range advertising was particularly interesting. A series of four advertisements was prepared for the daily papers to be run at intervals throughout the month of May when the power companies normally carry on their spring campaigns. The copy stressed modernity and tied in the purchase of this modern kitchen equipment with spring house cleaning. More specifically the "high price" myth and the "slow" myth were attacked and disposed of. Particularly was it stressed that low operating cost and speed were secured in a modern electric range through the positive nature of the heat control. An examination of the copy here reproduced will show that a great deal of ground was covered in telling the story of electric cookery in comparatively few words and by the use of comparatively little space.

A "box" carried in each piece of copy said, "The local electric light and power companies approve and service these modern electric ranges." Of course no specific ranges were mentioned but each dealer featured one or two makes on his sales floor and in his own advertising and it is interesting to note that the following leading makes were represented in the merchandise offered by the twelve firms participating: Armstrong, Benjamin, Crawford, Estate, Hotpoint, L. & H., Monarch, Standard and Westinghouse.

The cost of the range advertising was $1,550. Of this amount the two power companies paid 50 per cent and the other ten participating firms 50 per cent. Assessments against these ten were based in general on their size and the amount of business done, and ranged from $50 to $100 each. In the case of the small appliance advertising, the power companies stood 40 per cent of the cost, the other 60 per cent being pro-rated among the thirteen other participants. Less space was taken in these campaigns so that the actual amounts spent by all the firms was considerably less than in the case of ranges.

In any summary of results achieved it must be remembered that approximate figures only are available, and that many influences bear on these so that the efficacy of such a movement cannot be figured out with mathematical accuracy. In the first seven months of 1928 there were sold in the Portland territory approximately 1,550 electric ranges, of which the dealers outside the two power companies sold about 350, or 22½ per cent. This volume represents an increase for most of the outside dealers, and a decrease for the power companies. Also the total number sold is a decrease in the territory as against the same period of last year. One of the prime factors influencing the number of ranges sold in Northwest cities is the number of apartment houses sold, and this in turn is directly proportional to the number built, since a high percentage of all apartment houses built have in the past few years installed electric ranges. Thus the decrease recorded above is largely explained by the fact that apartment building has been materially curtailed in Portland during 1928. On the other hand sales to individuals have held up well in comparison to last year.

Speed
when
it is needed
"Lots of speed, but no control" has doomed the old, obsolete kitchen standby. The new 1928 Electric ranges match the old-timers' best speed—even surpass their most valiant efforts. But, what a difference!...the difference of CONTROL, even to the last unit of heat.
Scientific construction has made this possible. The new electric ranges are so engineered that you get just the heat you want, where you want it, and when you want it.
The busy housewife now has an ally that takes those hurry-up meals as a matter of course; emergencies are quickly and efficiently taken care of by the speed units of the new Electric ranges.
See the newest models today. Your dealer has a complete display in his window...skilled demonstrators are in attendance to explain every detail.
Operating Cost—
About Payment—
A small payment delivers a new electric range. Connect to your wiring and demonstration FREE!
The local electric light and power companies approve and service these modern electric ranges
Gevurtz Furniture Co.
Meier & Frank Co.
Ira F. Powers Furniture Co.
Stubbs Electric Co.
Edwards Furniture Co.
Portland Electric Power Co.
This is ELECTRIC RANGE Month
Henry Jenning & Sons
Olds, Wortman & King
Paul Schatz Furniture Co.
Watson-Stiff Furniture Co.
Wm. Gadsby & Sons
Northwestern Electric Co.
Investigate Electrical Cooking—See these Dealers' Windows!

The electric range newspaper copy stressed the modernity of electric cookery and answered many of the popular myths existing in the mind of the housewife. Speed and low operating cost were among the features emphasized.

Spring cleaning time
Electric Range" time
Everybody is Spring cleaning...homes are proclaiming the spirit of the season: the old goes out, the new takes its place. So OUT with the kitchen relic and IN with a new, modern ELECTRIC range!
THIS is the month—the whole month of May! It is dedicated to YOU by these Portland dealers...to help you in making the change.
The newest models are being displayed. Special terms prevail. Skilled demonstrators are in attendance. Everything is arranged to help you sign your "Declaration of Kitchen Independence"—by installing for you a 1928 type of kitchen stove...an ELECTRIC range!
See the newest of models in these dealers' windows. Pick out the one that fills that niche in the kitchen.
About Payments
A small payment delivers a new electric range. Connect and demonstration FREE!
Edwards Furniture Co.
Gevurtz Furniture Co., Inc.
Meier & Frank Co.
Paul Schatz Furniture Co.
Watson-Stiff Furniture Co.
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Northwestern Electric Co.
Investigate Electrical Cooking ··· See these Dealers' Windows

A master chart is kept by Mr. Bevan, showing the position of each "flyer" on the "air lanes." The chart at the left gives a weekly summary of the lighting units sold by the individual salesmen.

Home Lighting

IF SUCCESS lie in generalship certainly the home lighting campaign of the Pacific Gas and Electric Company has every element needed for its complete realization. Indeed, in its whirlwind beginning there seems to be every indication that the first really comprehensive home relighting campaign to be undertaken on the Pacific Coast will terminate with quotas exceeded in all districts.

Strictly speaking, this is not merely a campaign. The present drive is the culmination of a long, well planned and executed preparation begun over a year ago, following lighting campaigns which had proved to the company that such activity could be made worth while.

The theatrical experience of Frank Bevan, lighting sales engineer, served in good stead. Under his showmanship the three elements of the preparation were developed to a fine point before the actual selling campaign of Sept. 1 to Dec. 22 started. These elements were: (1) educational campaign directed at the public, (2) employee co-operation meetings, and (3) lighting salesmen's schools.

The goals set for the campaign were: The sale of 3,700 Duplex-a-lite floor and table lamps equipped with silk or parchment shades and 200-watt bulbs, and 3,000 Duplex-a-lite ceiling fixtures; this by the 38 lighting salesmen in the various divisions of the company. The sale of 7,500 kitchen lighting and bedroom lighting units, and the sale of 10,000 lamp kits of three different combinations, by employees of the company, either themselves direct or through the lighting salesmen.

Preparing the Field

Twelve months ago the preparation started. Into each division of the company Frank Bevan took a traveling "medicine show," as he affectionately terms it.

In the division office was set up the Miller Company display depicting the evolution of light. Against a special background this was set up so as to display 26 lighting pieces running from a crude cave man's shell or hollow stone oil wick lamp to the latest inside frost bulb. A lecture accompanied it daily, to which the public was invited. More than 20,000 pieces of literature on lighting, in the form of the program for this display museum, were distributed to visitors to the display.

At luncheon clubs, 47 of which were addressed, a talk on lighting was given. Walter E. Carlson, of the Edison Lamp Works, accompanied Mr. Bevan and with the shadow box gave dramatic demonstrations of the possibilities of lighting. Window displays in each district office also attracted visitors. Although no solicitation was made in these meetings voluntary sales were frequent, such sales even extending to electric ranges.

Enlisting the Employees

When this very important factor of seeing that the public was in a receptive frame of mind for home lighting had been well established a parallel activity was launched to acquaint employees with the campaign, offer them an opportunity to participate in it to their profit, and train them in the sales message. This step was taken immediately following the salesmen's school which will be described later.

Again every division office was visited. At each office a big meeting of all employees had been called. Officials of the company outlined the company's sales plan and Mr. Bevan described how an opportunity was to be given employees to earn all the profit on the lamp selling and kitchen lighting unit activity as a means of obtaining Christmas money for themselves. Again showmanship played a very important part in this "one night stand" tour.

Immediately following each meeting every employee in the company received a broadside (illustrated here) setting forth the details of the selling plan. A book of order blanks and a book of the "pink slip" or prospect blanks of the company accompanied it. Briefly, the employee Christmas money proposition was as follows:

The entire kitchen lighting quota of 7,500 units is to be sold by employees. A cash commission of $1 apiece is paid for each unit sold. The duration of the campaign is divided up into four 30-day periods, for each of which a $10 cash prize is offered to the employee selling the greatest number of units. It is planned also that the 10,000 lamp kits, in the new doll-house cartons, be sold chiefly by employees. There are three kits to be sold with three different combinations of lamps in them, earning the employees commissions of 25, 35 and 40 cents respectively. As with the kitchen lighting units prizes of $10 for the most sales in each 30-day period are offered.

It is felt that with this activity carried on by employees of the company the 38 regular domestic lighting salesmen can be released to concentrate upon the floor, table and ceiling fixture campaign.

To every employee turning in a prospect for the floor or table lamp or ceiling fixture, which is later closed, $1 is to be paid. To the employee turning in the greatest number of prospects which are closed a prize of $25 is to be given. There are other prizes of $20, $15, $10 and $5. Prospects for other appliances on campaign by the company, however, are included in this prospect prize offer.

Equipping the Salesmen

So much for the supplementary campaigns, by which the lamp kit cartons and the kitchen lighting units are to be sold, primarily. So much also for the creation of public acceptance for a lighting campaign. How, then, were the salesmen trained to their job, the real job of refixturing the homes of northern and central California?

To San Francisco, for a two-day "get together" and schooling, Aug. 23 and 24, at the P. G. and E. auditorium, every domestic lighting salesman of the company was called.

On the first day, following roll call, R. T. Stephens, manager of electric sales, first addressed the meeting, after which Mr. Bevan outlined the entire domestic lighting program and in particular the campaign just starting. Walter Carlson

Takes Wing

in New P. G. and E. Relighting Campaign

gave a demonstration of "Incandescent Light Sources" and Victor W. Hartley, executive secretary, California Electrical Bureau, gave the P.C.E.A. lecture on "Eye Conservation" given last year before Parent-Teachers' associations. W. B. Martin, supervisor of lighting sales, East Bay division, and W. P. Hanbridge, supervisor of sales, San Francisco division, then displayed the lighting equipment to be sold.

That afternoon R. E. Fisher, vice-president in charge of public relations and sales, and H. M. Crawford, general sales manager, addressed the meeting, introducing Guy P. Norton, vice-president of the Duplex-a-lite division of the Miller Company, Meriden, Conn., after which a study of the fixtures and lamps was made and the principle of illumination discussed.

Friday's morning meeting was devoted to sales preparation. J. Charles Jordan, manager of advertising and publicity, Arthur Adkins, of the publicity department, Don Ray, manager of the bureau of public relations, and others spoke, outlining the advertising and publicity to be given the campaign and the responsibilities of salesmen to company good will. Mr. Crawford then introduced Frank H. Beckman, who gave a stirring talk on "Salesmanship in 1928." Guy F. Norton then closed the morning session with a complete discussion of the sales manual prepared by this company to assist lighting salesmen.

The afternoon session was spent in outlining the fall lighting sales campaign, "How Far Can You Fly?"

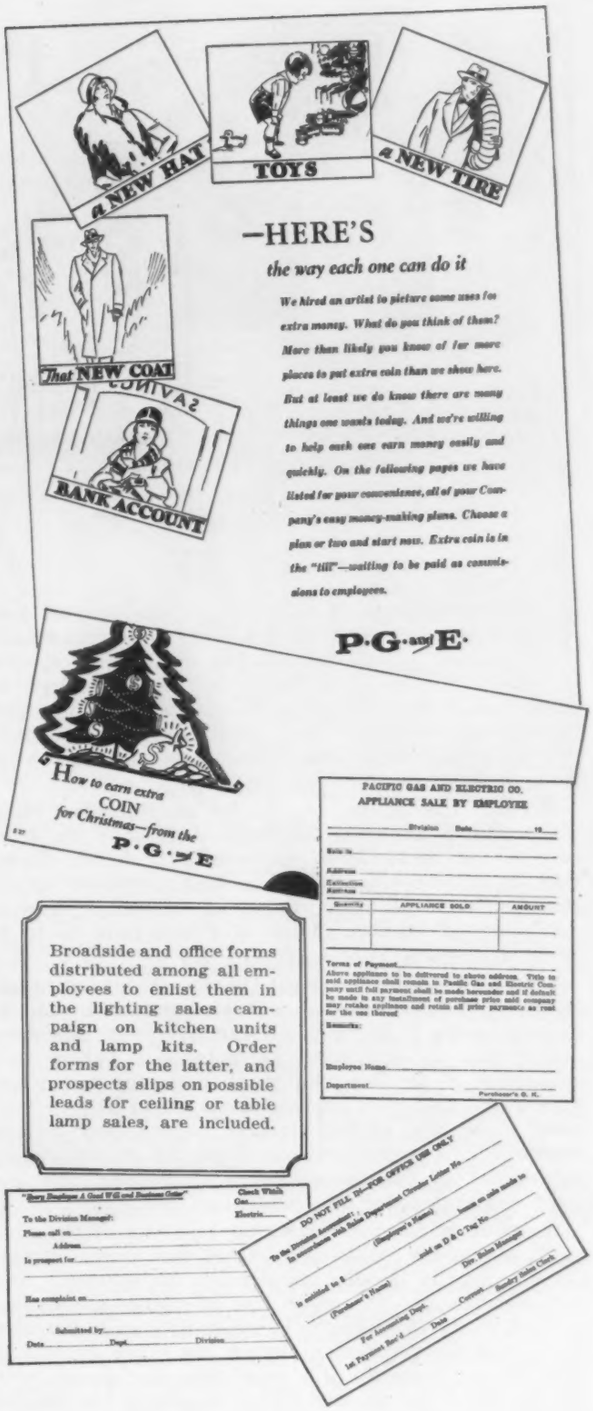
The Air Line Campaign

An air line map has been drawn, a duplicate of which is in each division office. The total of 161 units apiece which is set for each salesman's quota is marked off as "Duplex-a-lite" miles, each of which represents five miles air line on the journey. Each division office is an airport. Each salesman has a "ship" pin to mark his progress in the race. Division managers are designated as "airport superintendents."

To the salesman whose ship flies farthest—that means clear around the circuit once and beyond as far as possible—a Ford Tudor sedan is to be given. There are sixteen weekly prizes of $10 each for the salesmen flying the farthest during each week. In previous campaigns all competitive division prizes were awarded to division managers. This campaign, however, gives to the division sales manager the competitive prize, which is to be four hours in the air or its equivalent, thus maintaining the air flavor as much as possible for the entire campaign.

An unusual twist was given to the contest when J. F. Pollard, division manager, Salinas, offered a crate of lettuce to the first "airman" to reach Salinas. Not to be outdone, all the other division managers offered products of their terrirtory to the sales-airmen reaching their "airports" first, as follows: J. D. Kuster, San Jose, 5-lb. crate of prunes; Jack Heryford, Stockton, a 100-lb. sack of potatoes; Edward Florence, Sacramento, a case of 2 doz. cans of asparagus; B. M. Cooper, Auburn, a gold nugget; Edward Johnson, Marysville, a case of 2 doz. cans of peaches; I. D. Adams, Chico, 25 lb. of almonds; G. R. Milford, Red Bluff, 100 lb. of Pitt River apples; H. L. Jackman, Eureka, a quantity of Eureka crabs; Harry Ridgeway, San Rafael, a case of Novato cheese; Lee Newbert, Oakland, to the second flier to reach this part, a mystery prize; and to top off, Harry Bostwick, San Francisco, a $25 merchandise order.

Advertising will consist mainly of a broadside to be mailed to every home on the company system, announcing the salesman's visit. Newspaper space, window displays and other means will also be employed. "Plane Fax," a sales bulletin, will keep all district salesmen acquainted with the location of their rivals' "buyplanes" and "moneyplanes" in this interesting race for light.


A NEW HAT
TOYS
A NEW TIRE
—HERE'S
the way each one can do it
We hired an artist to picture some uses for extra money. What do you think of them? More than likely you know of far more places to put extra coin than we show here. But at least we do know there are many things one wants today. And we're willing to help each one earn money easily and quickly. On the following pages we have listed for your convenience, all of your Company's easy money-making plans. Choose a plan or two and start now. Extra coin is in the "till"—waiting to be paid as commissions to employees.
That NEW COAT
BANK ACCOUNT
P·G·and E·
How to earn extra COIN for Christmas—from the P·G·&E
PACIFIC GAS AND ELECTRIC CO.
APPLIANCE SALE BY EMPLOYEE
APPLIANCE SOLD
AMOUNT
Terms of Payment
Remarks:
Employee Name
Department
Broadside and office forms distributed among all employees to enlist them in the lighting sales campaign on kitchen units and lamp kits. Order forms for the latter, and prospects slips on possible leads for ceiling or table lamp sales, are included.
DO NOT FILL IN—FOR OFFICE USE ONLY

Four weeks of the campaigning have passed as these pages go to press, and while all districts have not yet been heard from within the last day or so, the number of ceiling and table and floor lamps sold has already passed the 500 mark, with the "flyers" just beginning to hit a stride. Leading from the first has been C. W. Hatch, of the East Bay division of the company, with R. R. Becker, of Salinas division, a close second.

Dick Dinnigan, in the employee lamp kit sales, leads all the rest, with 78 kits sold in two weeks, thus adding many dollars to his salary for this period. So goes the campaign.

Planning a Campaign

1000 *E*lectric

Past experience of Southern California Edison Company leads commercial executives to base campaign on following three principles: Low Down Payment, Liberal Trade-In Allowance and Attractive Premium. Novel advertising ideas evolved including use of new C. O. D. postcard.

One of the 100,000 small stuffers and C.O.D. postcard which will be distributed with the October light bills.

ELABORATE plans have been made by the merchandising staff of the Southern California Edison Company, under the direction of H. C. Rice, merchandising manager, to launch and carry through its third annual Hotpoint range campaign beginning early in October. A quota of one thousand ranges has been set but it is anticipated that this quota will be exceeded by a wide margin.

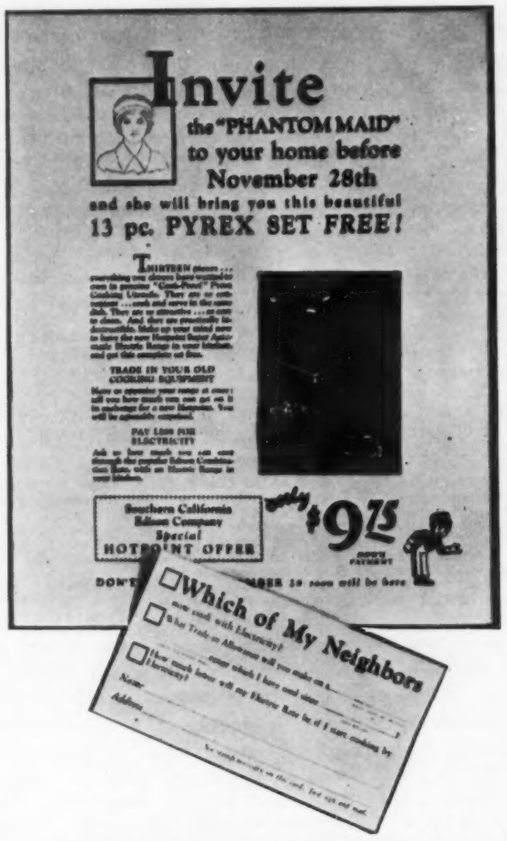
Regular list prices are to be maintained. Three major themes are to be capitalized. First, a low down payment of $9.75 is to be accepted; second, liberal trade-in allowance on the old cooking equipment of the customer is to be made; third, an attractive premium consisting of thirteen pieces of Pyrex ware is to be given with each range sold.

The $9.75 down payment is to cover the range delivered to the home but any wiring necessary to be done is extra. In previous campaigns it had been proved that a very small percentage of buyers took advantage of the opportunity to have the range and wiring installed for the low down payment. A very large percentage of this class of buyers later became reverts. This experience convinced the merchandising department of the inadvisability of making this low down payment cover the installation cost.

As in all of the merchandising activities of the company all dealers have been invited and urged to participate in the benefits possible to be derived. The Edison company will supply free of charge a premium of a set of Pyrex dishes to be given with each Hotpoint range sold by the dealer during the range campaign. The Edison company will reimburse the dealer with two-thirds of the amount which he allows for the old cooking equipment, providing the total amount allowed is not more than 15 per cent of the total cash selling price of the new range sold. The dealer, of course, turns over the old range to the Edison company. The Edison company's assistance to the dealer on trade-in allowances will cover all dealers on any make of range but the premium will be given free only in the case of a Hotpoint range sale. The amount of the trade-in allowance will be based on a percentage of the list price of the new electric range to be purchased.

All advertising matter will be signed, "Southern California Edison Company or your own dealer." Three forms of advertising will be used,—window trims, newspaper and direct mail.

A model window will be set up at the general office and photographed. Copies of this photograph with the material necessary for the arrangement of the window will be furnished each one of the 70 sales offices of the company. A series of six advertisements will be run in the 164 papers throughout the Edison system. These advertisements will range in size from 2 column 10 in. to 3 column 15 in.



One of the three broadsides which are to go out with a return postcard to a selected list of 50,000 prospects.

to Sell Ranges

In more than 25,000 California Homes
Hotpoint
Some of the thousands of Hotpoint RANGE Users in Southern California
15,000 HOMES

The large folder, 16 x 22 in., is to be sent out with 150,000 bills during October. It lists names of 5,500 range users on the Edison system. A small broadside and a sample of the C.O.D. postcard are also shown.

The direct-mail campaign upon which the bulk of the effort is to be expended is the most comprehensive use of this medium ever employed by the company in any range campaign. Three broadsides will be mailed to a carefully selected list of 50,000 names in the territory. In addition to these broadsides, 250,000 stuffers will be sent out with the October electric light bills. The practice of sending stuffers with the light bills has been followed regularly by the company for the past two years and every month the bills carry with them some announcement of a merchandising opportunity. The repetition of this practice has served to educate the Edison consumer to a degree of expectation which has proved valuable in building up the sale of small appliances.

The stuffer to be used for the range campaign is a 16 x 22-in. sheet containing about 5,500 names of users of electric ranges on the Edison system. This is to be printed on thin paper and folded so as to go into the standard envelope with the bills. It will carry the caption, "In more than 25,000 California homes." Scattered through the list of names on the stuffer will be the display advertisements telling of the campaign. In all of the advertising the low down payment, liberal allowance for old cooking equipment and the attractive and valuable premium will be featured.

Taking advantage of the recently enacted postal legislation permitting use of a 3-cent c.o.d. postcard, every one of the 400,000 pieces of direct literature will carry one of these return cards.

The 150,000 cards which will go out with the three broadside mailings of 50,000 each will give the customer an opportunity to ask three questions. First, "Tell me what trade-in allowance you will make on a..... range which I have used since ....." Second, "How much will my electric rate be lowered if I start cooking with electricity?" Third, "Which of my neighbors now cook with electricity?" On the postcard to go out with the 250,000 stuffers containing the list of names the third question of course will be omitted.

To stimulate a thoroughgoing activity in the sales organization itself, a series of prizes and bonuses have been offered. First, to the district manager whose district makes the highest percentage of its quota, a Servel drinking fountain for installation in his office is to be given. This is a general prize for the entire Edison system. To the district managers whose districts make the largest quota in their own sales divisions, Telechron desk clocks are to be given. There are four sales divisions on the Edison system. To add interest to the sales supervisors in each of these districts one dollar for each range sold over the system quota of 1,000 is to be set aside to be divided among the four sales supervisors. Forty per cent of this amount goes to the supervisor whose division makes the highest percentage of its quota; 30 per cent goes to the second supervisor; 20 per cent to the third supervisor and 10 per cent to the fourth and last supervisor.

A bonus of $2.50 per range over and above his regular commission will be paid each sales specialist for each range which he sells over his personal quota. These bonuses will be accumulated and paid at the end of the campaign in a lump sum. Also $25 will be paid to the sales specialist in each division who makes the largest quota of sales during the first and second week in the campaign.

A certificate of sales proficiency and a lapel button will be given to each sales specialist making 100 per cent of his quota during the campaign providing he did not win one of these certificates and buttons during the Hotpoint campaign last year. Those specialists who did win this certificate last year and who make their quota this year will receive 200 per cent buttons and certificates.

Cash prizes will be paid for water heater sales made in excess of a quota which will be established for each sales specialist.

Heretofore it has been the practice to carry the announcement of the range campaign to the district offices by means of a series of "pep" meetings held throughout the system. In lieu of that method it has been decided this year to hold a two-day sales campaign at the Ontario plant of the Edison Electric Appliance Company, Thursday and Friday, Oct. 4 and 5. At this convention all information and announcements relative to the campaign will be presented.

Organized for Red Seal

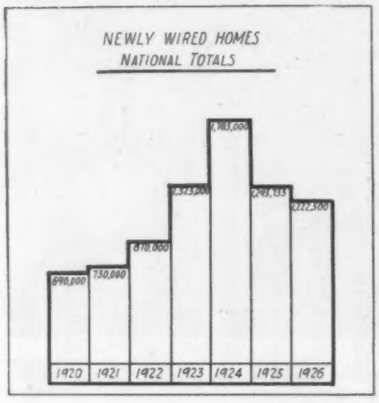
Copyright S.E.D.

By

Victor W. Hartley
Executive Secretary, California Electrical Bureau.

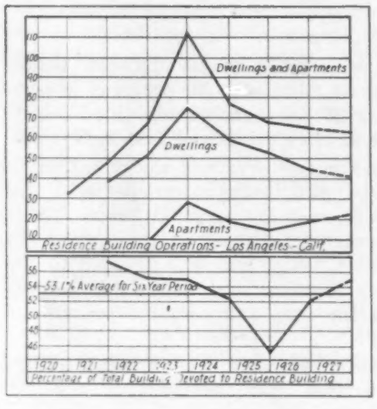
***OVER THE TOP** in eight months, the Red Seal drive of 1928 is bringing in results to satisfy even the most skeptical. Boiled down into the fewest words possible—although the story deserves more elaborate telling—all the cogent facts concerning its progress and its success, its meaning in terms of business to all branches of the industry, are marshalled here. For simplicity these facts are presented somewhat as an "illustrated lecture" in which three major premises stand out sharply. These are:*

The need for an industry market development program.
The value of the Red Seal Plan as a sales-builder and load-builder.
The progress which has been made in promoting the Red Seal Plan in California.



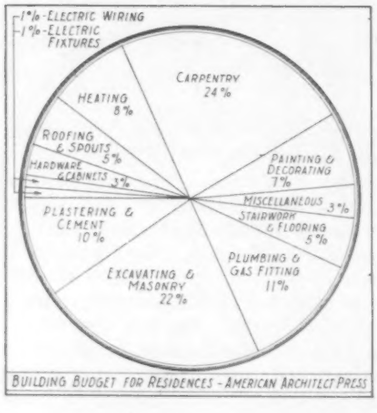
THIS chart shows the trend of residential building throughout the United States over a seven-year period. The 1927 figures are not available but they were a continuation of the downward trend that has followed the 1924 peak of construction. The fact most forcibly brought to the attention by this chart is the annual reduction in the market for wiring materials and devices resulting from this diminishing building program; and the necessity for a market development activity to increase the wiring specifications of the buildings being constructed in order that the demand for electrical equipment shall not shrink with the building program.

These figures are for the entire nation. Actual figures for the State of California are not obtainable, but here the trend has been very similar to the national curve with a slightly sharper downward pitch.



THE PREVIOUS chart presented the national picture. Although figures for the entire State of California are not available, this chart will localize the picture somewhat. It represents the residence building curve of the City of Los Angeles for the past seven years. Here again the story is almost identical—a rapid rise from 1920 to 1924, in which year there was a sharp drop followed by a steady decrease each year since.

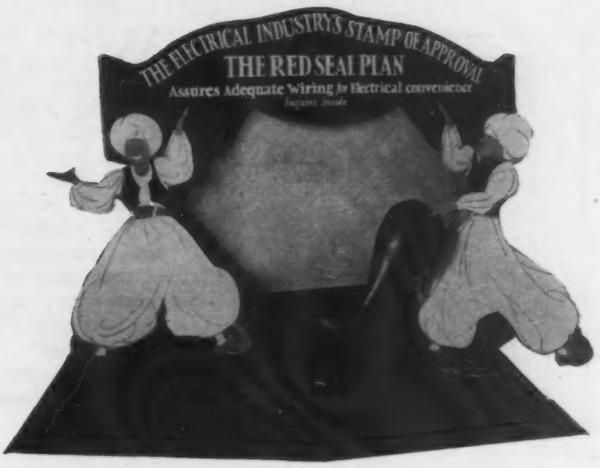
The lower section of this chart shows the relationship between the residence building program and the total building program, and here we see a rapid rise. In other words, even though the residence building program is dropping off annually, commercial and industrial building is dropping off so much more rapidly that the diminishing residence construction is constantly becoming representative of a larger and larger percentage of the entire program. In 1926 residential construction represented 45 per cent of the entire building program; but today, even though residence work has diminished 7 per cent, as shown in the top curve of this chart, it represents 54 per cent of all the building being done. It is to residence building that we must look for our potential market.



THIS chart, compiled by the American Institute of Architects, shows how the customer's dollar is split up among the various crafts contributing to the structure of a home. It will be observed that the smallest section on the entire chart represents the electrical industry's share, 2 per cent—only 2 cents out of every building dollar.

As shown on the preceding chart, a 2 per cent return on the 1923 residence building of Los Angeles meant $2,207,020. In 1927 a 2 per cent return from the same class of building amounted to $1,273,520,—almost $1,000,000 decrease in four years. It is beyond our power to increase the building program of the country but it is entirely within our power to do exactly what the plumbers, plasterers and other crafts have done—increase our percentage of the building dollar through an intensive, co-operative educational program having behind it the sincere support of every individual in the electrical industry for the purpose of bringing to the attention of the building public the inadequacy of the present general standards of wiring. That brings us directly to the Red Seal Plan and some surveys made to determine its true value as a job and load-building factor.

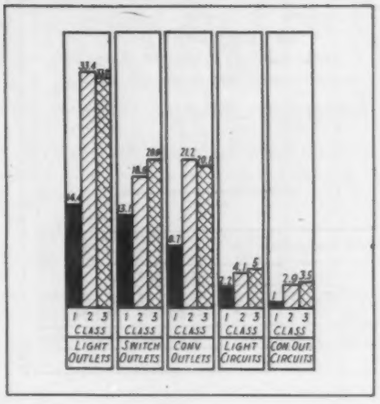
Profits to all Branches of the Industry



FIGURES on the next three charts were obtained in a survey of 500 homes taken at random throughout California. Class 1 represents the homes on which no Red Seal effort was made; Class 2, those upon which an unsuccessful effort was made; Class 3, the Red Seal homes.

The most noteworthy consideration revealed by these figures is that the homes upon which an unsuccessful Red Seal effort was made were built up to a standard virtually identical with the averages of the Red Seal homes themselves, only failing to secure Red Seal certificates because of the fact that the range service has only been partly installed, or some such minor consideration as the refusal of the owner to put lights and convenience outlets on separate circuits.

This chart shows a general increase of over 100 per cent in branch circuits and outlets installed as a result of Red Seal effort. Lighting outlets were increased from an average of 14.4 per home to an average of 33.1; switch outlets from 13.1 to 19.7; and convenience outlets from 8.7 to 20.6; while the number of lighting circuits was increased from an average of 2.2 to 4.5, and convenience outlet circuits fom 1.0 to 3.2.



THIS chart deals with the comparative main-service installations in the three classes of homes. One interesting fact which it brings to the attention is that whereas 96 per cent of the Class 2 homes have three No. 10 main-service wires, the Red Seal effort put in on them has resulted in 86 per cent of them being equipped with 1½-in. conduit which is adequate to accommodate three No. 1 wires. In other words, the owners have been sold the idea that they are going to want to increase their electrical installations at a later date and the facilities to take advantage of future load-building programs have been provided; whereas, in those homes where no Red Seal effort was made, 96 per cent of the installations are of ¾-in. conduit, capable only of carrying three No. 10 wires, and consequently classifying the jobs forever as "minimum consumers" and limiting them to their present inadequate service.

These Class 1 jobs are the type which result in "2 per cent of the building dollar for the electrical industry" and from the last two charts a clear picture can be formed of what the Red Seal Plan means to manufacturer, jobber and contractor in overcoming this condition.

ELEMENTS IN MAIN SERVICE

		*CLASS 1 HOMES	*CLASS 2 HOMES	*CLASS 3 HOMES
Conduit	½"	2.6%		
	¾"	95.6%	10.2%	
	1 "	0.9%	0.3%	
	1¼"	0.9%	3.0%	62.1%
	1½"		86.2%	24.3%
	2 "		0.3%	13.6%
Wire	2-10s	87.8%		
	2- 8s	2.6%		
	3-12s	0.9%		
	3-10s	7.8%	95.7%	
	3- 8s		1.3%	
	3- 6s		1.8%	
	3- 4s	0.9%	0.6%	54.1%
	3- 2s		0.6%	35.1%
	3- 0s			2.2%
	3-00s			2.7%
	3-000s			5.4%
Switch	30A	96.5%	96.7%	
	60A	3.5%	0.9%	27.0%
	100A		2.1%	54.0%
	200A		0.3%	16.3%
	300A			2.7%

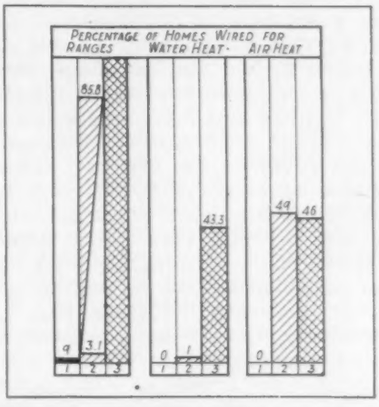
The above figures represent the percentage of homes equipped with the specified sizes of service as compared with the total number of homes surveyed.

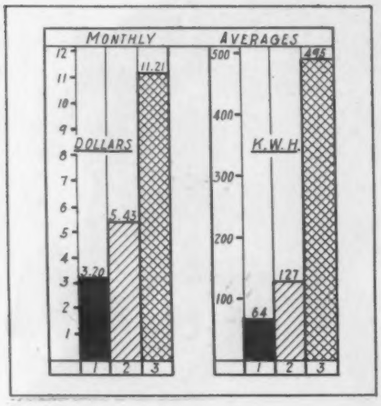
*Class No. 1 Homes are those upon which no RED SEAL effort was made. Class No. 2 Homes are those upon which unsuccessful RED SEAL effort was made. Class No. 3 Homes are those upon which successful RED SEAL effort was made.

WHAT power company, manufacturer, jobber or contractor is not interested in seeing the number of homes wired for ranges jump from 0.9 per cent to 100 per cent; wired for air heaters jump from zero to 49 per cent; and wired for water heaters jump from zero to 43.3 per cent? The accompanying chart covers that part of the survey which determined just what percentage of homes in each of the three classes were wired for these heavy-duty appliances and the above figures represent the conditions which were found to exist.

In the case of the range it will be noted that in the Class 2 homes 3.1 per cent have complete range installations and 85.8 per cent have partial range installations. By partial installations is meant that as a result of Red Seal effort the builder has installed all of the range service which goes in the walls,—conduit, outlet, everything that would necessitate, if left out, an expensive rewiring job later, but does not install the range switch or pull the wires.

Incidentally, it is a most interesting fact that 82 per cent of the occupants of Red Seal homes cook electrically.





WHEN the survey, in which the figures presented on the preceding charts were acquired, was made, the homes were in the course of construction. Most of these homes have now been occupied a year and they have all been re-surveyed by taking from the power company records their monthly bills and their monthly kw.-hr. consumption. The figures obtained, representing as they do 500 homes taken at random before there was any knowledge of what equipment was going to be installed, indicate the load-building possibilities of the Red Seal Plan.

The results of this latest survey are shown on this chart: Class 1 again represents those homes on which no Red Seal effort was made, and in this class of home we find an average monthly bill of $3.20. Class 2 represents those homes upon which unsuccessful efforts were made to sell the Red Seal Plan and this class of home has an average monthly bill of $5.43; Class 3, Red Seal homes with an average monthly bill of $11.21.

In the matter of current consumed we find in the Class 1 homes 64 kw.-hr. per month; in the Class 2, 127 kw.-hr.; and in the Red Seal 495 kw.-hr.

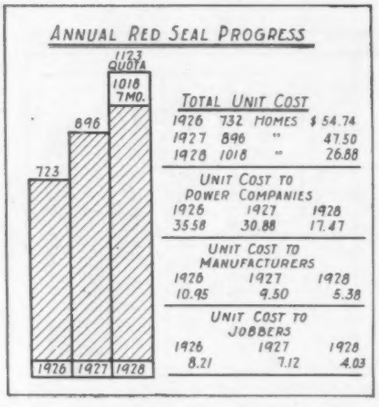
RETURN TO POWER COMPANIES ON INVESTMENT IN CALIFORNIA ELECTRICAL BUREAU

Average Monthly Revenue Red Seal Homes $ 11.21
" " " Non " " " 3.20
Increase Due to Red Seal Effort 8.01

YEAR	INVESTMENT	NUMBER OF RED SEAL HOMES	ANNUAL INCREASE PROFIT PER HOME	TOTAL INCREASE ANNUAL PROFIT	INCREASED PROFIT OVER INVESTMENT
1926	31,392	723	96.00	69,408	38,016
1927	24,060	896	96.00	86,016	61,956
1928 7 MO.	17,789	1018	96.00	97,728	79,939
TOTAL	71,192	2637	96.00	253,152	181,960

IN ESTIMATING the return to the power companies on their investment in the California Electrical Bureau we have used the figures presented on the preceding chart showing an average monthly revenue from Red Seal homes of $11.21 as compared to an average monthly revenue from non-Red Seal homes of $3.20, making a balance representing the increase due to Red Seal effort of $8.01 per month or $96 per year. By multiplying the number of Red Seal homes procured each year by this factor we arrive at the total increased annual profit during the period that the Red Seal Plan has been in operation of $253,152, whereas during that same period of time the power company investment in the Bureau has been $71,192, providing a net return, over and above their investment, of $181,960.

These figures are, in themselves, astonishing; but another fact to be borne in mind is that the returns are, of course, cumulative, in that each Red Seal home goes on year after year producing $96 more revenue than would have been derived from it if no Red Seal effort had been put forth.



THIS chart shows the progress made during the period that the Red Seal Plan has been promoted in California. In 1926, 723 Red Seal homes were recorded. In 1927, 896 were recorded, a 23 per cent increase over the preceding year. The quota set for 1928 was 1,120—a 25 per cent increase over the 1927 total. During the first seven months 1,018 applications have been procured—90 per cent of the year's quota in slightly over one-half of the time.

This chart will also show the annual decline in the unit cost per Red Seal home. In arriving at this unit cost all Bureau expenses have been charged against the Red Seal Plan and no consideration has been given to the many hundreds of Class 2 homes materially built up through Red Seal effort but not recorded to the credit of the plan. The entire Bureau budget has been divided by the total number of homes registered during the year. This manifestly gives a unit cost considerably higher than it actually should be, but, as the same basis of computation has been used each year, each unit cost shown is true in its proportion to the others.

SINCE the preparation of the above charts the returns for the month of August have been compiled, showing a net total of 161 Red Seal applications received during that month, bringing the eight-month total to 1,179, or 59 Red Seal homes over the year's quota. The plan is just now reaching the point where architects and builders are beginning to accept it as being of real concern to them, the resistance which retarded its progress during the first two years of its promotion is wearing away, it is gathering momentum and the industry is beginning to harvest on its early efforts.

There are still some within the industry who are skeptical of the value of this work, but in justice to the Red Seal Plan let this be said of it—the loudest of its praises are sung by those who have worked most strenuously toward its success. Those power companies, manufacturers, jobbers and contractors who have aided the Bureau at every opportunity in furthering the plan, who have used the Red Seal story as a vehicle for their own sales programs and have regarded the monthly Red Seal report of the Bureau as a prospect list are the ones who are most enthusiastic over its possibilities. The more closely one studies the plan and analyzes its accomplishments of the past the more one realizes its future possibilities.

Business analists are generally agreed that the great competition today is not between the individual firms in an industry but between industries themselves, each struggling for a larger share of the consumer's dollar. Each industry must organize solidly behind its own market development program. The pioneering of a new idea, the establishing of an acceptance of it, is a slow, tedious task. The phenomenal progress which has been made by the Red Seal Plan in securing the approval of architects, builders and owners is gratifying evidence that they are becoming electrically minded and welcome a plan which conveys to them the electrical industry's approval in a "Symbol of Adequate Wiring."

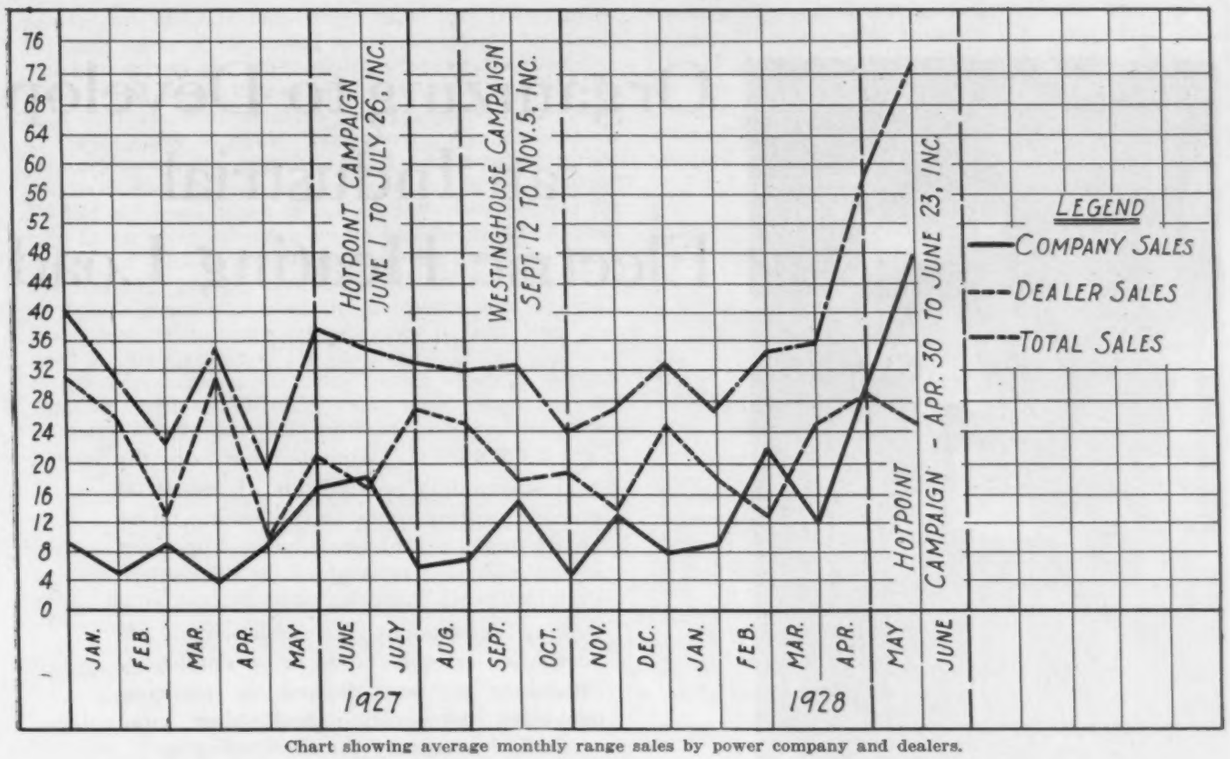


Chart showing average monthly range sales by power company and dealers.

Periodic Campaigns Send

Range Sales up, Up, UP

WHAT effect have periodic campaigns on total electric range sales in a given territory? Does active range campaigning by the power company increase or decrease range sales by dealers? For the purpose of answering such questions as these a study has been made of range sales over a period of eighteen months in the San Jose Division of the Pacific Gas and Electric Company. The results of the study, plotted on the accompanying chart, not only answer these questions but also show the increasing consumer acceptance resulting from the combined sales efforts of power company and dealers.

In discussing the subject of periodic range campaigns, John S. C. Ross, division sales manager of the company at San Jose, says:

"In interpreting the trends shown on the chart it must be remembered that the period considered was a time of general business depression, particularly in this division. For this reason it would be unfair to compare this period with the preceding months in 1926. The effect of the business depression is shown clearly in the decreasing volume of total range sales during the first five months of 1927.

"Let us now trace the effect of our campaigns in the San Jose Division, starting with the Hotpoint campaign in June, 1927. As a result of this campaign the total volume of range business increased from 19 ranges in May to 38 ranges in June and 35 ranges in July. Was this business taken away from the dealers? Quite the contrary. The dealer sales during these months were 21 and 19 ranges respectively as compared with a total of 10 for the month of May. During the month of August there was no campaign activity. The total volume of range sales was 33, of which the dealers sold 27, as compared with the total of 10 for May. Unquestionably, during this period dealers were cashing in on the consumer interest created during the previous two months of campaign activity.

"In the Westinghouse campaign, which was conducted from Sept. 12 to Nov. 5, range sales were not as great as in the previous campaign as the chart shows. During the month of November 24 ranges were sold with the dealers disposing of 19. From that month forward the total volume of sales shows an almost continuous increase, and during the months of May and June, 1928, all records were broken for total ranges sold. The number of ranges sold by dealers during the two months were 29 and 27, respectively, as compared with an average of 22.6 ranges sold during the five months preceding the first campaign in 1927 and 10 ranges sold in May, 1927. Since the first campaign in 1927 average dealer sales have remained constant and total sales have increased 28 per cent."

Range Campaigns Increase Sales 28 Per Cent

Average monthly range sales, five months previous to first 1927 campaign—

By company	7.2 ranges
By dealers	22.6 ranges
Total sales	29.8 ranges

Average monthly range sales during six campaign months (three campaigns)—

By company	22.5 ranges
By dealers	22.5 ranges
Total sales	45.0 ranges

Average monthly range sales during thirteen months since first campaign (including campaign months)—

By company	16.1 ranges
By dealers	22.1 ranges
Total sales	38.2 ranges

Increase in average monthly sales since instituting first campaign—28 per cent.

Organizing to Develop an Industrial Electric Heating Load

By E. A. Wilcox
Industrial Heating Engineer, San Francisco

SUCCESSFUL capitalization of the load-building possibilities of industrial electric heating requires the setting up of an adequate organization backed up by a well formulated sales plan. In this article the author discusses the organization of a heating department, the selection of its personnel, sales methods to be employed, procedure to be followed in securing necessary co-operation and other vital factors necessary for developing an industrial heating load.

HEAT in some form or another is applied to almost every manufactured article at some point in its production process. In many instances the heating operation can be performed best by electricity on account of any or all of the following advantages of electric heat: safety, convenience, flexibility, cleanliness, simplicity of control, reliability, economy. As a consequence, practically every factory, shop and industrial plant throughout the country is a prospect for some electric heating application.

The development of this highly desirable industrial heating load is one of the most important problems facing the central stations in their program of electrification of industry. In capitalizing upon the load-building possibilities of industrial heating there are certain definite facts that must be given consideration by the commercial executive who desires to develop this load. First and foremost is the necessity for a proper organization charged with definite responsibilities and armed with a well formulated plan of procedure.

For the central station ranging from medium to large size it is desirable to organize a separate division in the sales department with the individual in charge held responsible for results. The duties of this division should be confined to electric heating alone.

Selection of Personnel

In selecting the personnel to man the industrial heating division serious consideration should be given to a number of important factors. The department head should have a knowledge of his subject,—the more experience, the better. He should be a man of some years so that his assertions will carry weight with the industrial executives with whom he comes in contact. He should be one who has shown interest in the subject and a desire to give it his undivided attention. A man fortified with patience and a preference for promotional effort is best equipped to sell industrial heating; the high pressure salesman will be a failure. A recent editorial in *Electrical World* forcibly sets forth the qualifications of the industrial heating specialist. It says:

"Intelligent application of electric heat to industrial processes requires something more than unbounded enthusiasm and a speaking acquaintance with thermal equations. Commendable and necessary as these requisites may be in the make-up of the industrial heating sales engineer, they should be tempered with other qualifications of equal, if not greater, importance. It has been stated and often repeated that the secret of industrial heat application is the sales engineer's familiarity with manufacturing processes. A little further examination of the records of those who have done outstanding work in developing the heating load shows that there are other elements which have built up an essential background of experience and knowledge. These qualifications have been a thorough acquaintance with motor application, familiarity with industrial plant layout and processes, familiarity with central station practice and rates for service, knowledge of power plant, steam and mechanical equipment and, finally, some executive ability. In other words, building the industrial heating load is no job for a novice.

"Some power companies have realized the need for seasoned experience and accordingly have charged either the chiefs of their power sales departments or a senior salesman with this responsibility. Other com-

panies—too many in fact—have fallen into the habit of 'wishing' on newly recruited power salesmen those tasks which required the most development work involving much research and long-drawn-out negotiations. Industrial heat applications often come under this category, and the power company just about as often loses a prospective heating load because a junior salesman did not have the necessary background to 'carry through.' He did not know when to call on the manufacturer for help as an older salesman would have done. The usual excuse for such a practice is that the new man 'needs the training' or 'the experience will do him good.'

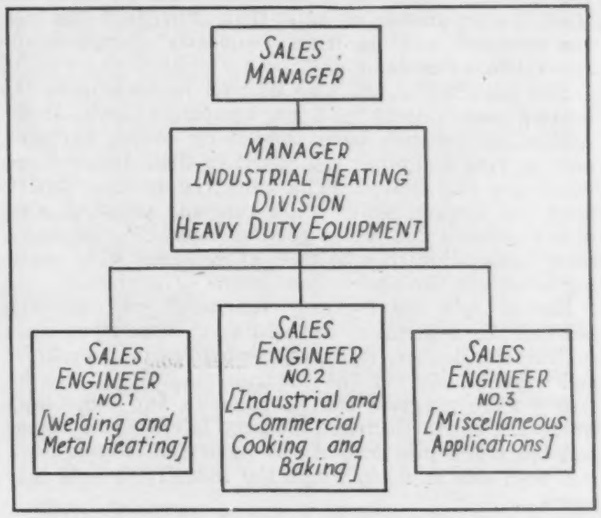
"Power companies need the industrial heating load; they need sales man-power to get it, but they also need in this man-power the sales-engineering experience of their present power sales force, which is already familiar with industrial plants and processes and acquainted with the personnel in local manufacturing plants."

Organization Plan

Larger central station organizations having three or more men in their industrial heating departments may divide either the territory or the work among the sales engineers. The latter is preferable because no individual can grasp quickly all phases of industrial heating as would be desirable were the territory divided. The sales engineer can become an expert only if he specializes.

Assuming that a central station has an industrial heating division consisting of four men with one of them in responsible charge, it would be logical for the latter to specialize on heavy-duty melting and heating furnaces, large industrial ovens and the like. One of the others might be assigned to electric welding and metal heating; another to industrial and commercial cooking and baking and the last to miscellaneous applications, which are without number. Customers in a territory combed by four such specialists would soon begin to think seriously of electric heat and recognize it as a factor in their industrial processes worthy of consideration.

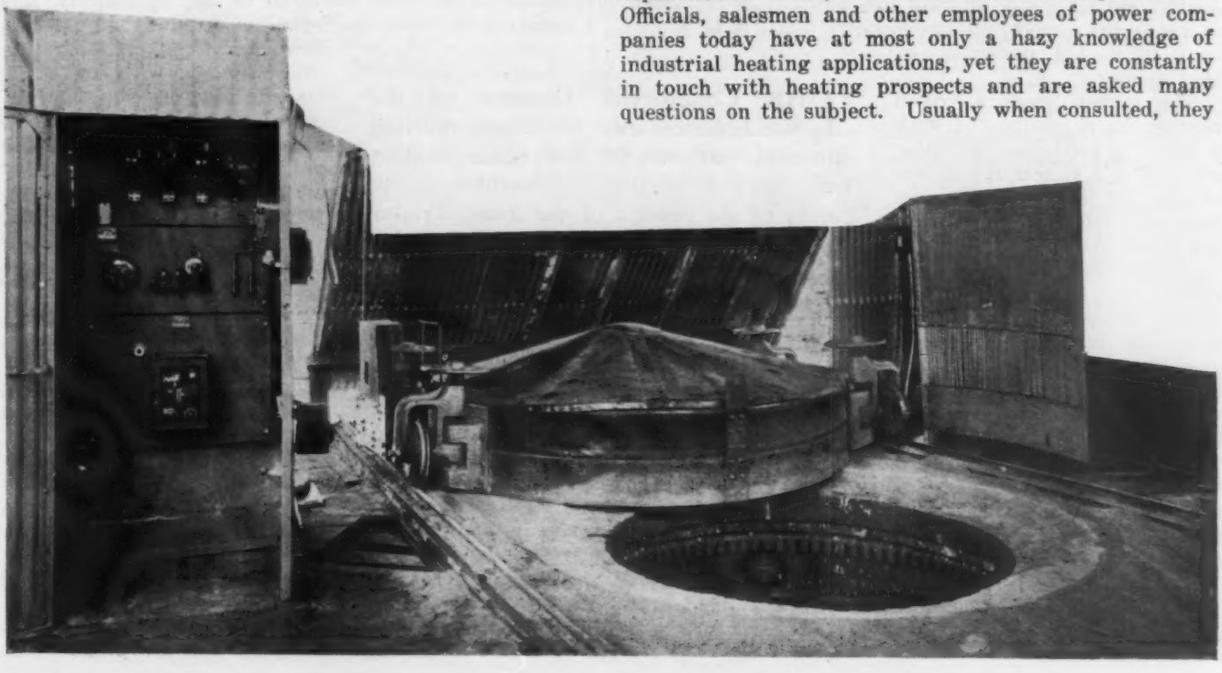
In formulating a sales plan to be followed, the usual methods of central station sales activity may be employed. It is desirable to make a survey of all industrial plants on the system for the purpose of determining the best prospects and classifying them according to possible applications. Prospect cards should be filled out and filed and all progress made with the prospect recorded upon them.


SALES MANAGER
MANAGER INDUSTRIAL HEATING DIVISION HEAVY DUTY EQUIPMENT
SALES ENGINEER NO.1 [Welding and Metal Heating]
SALES ENGINEER NO.2 [Industrial and Commercial Cooking and Baking]
SALES ENGINEER NO.3 [Miscellaneous Applications]

Organization chart for an industrial heating department in a large central station.

There should be fair-minded and whole-hearted co-operation with manufacturers' representatives and full use should be made of the knowledge and experience of these men. Certain well-directed advertising, usually of the direct-mail type, should be employed. Frequent personal calls are essential. Finally, the success of the heating department will depend largely upon study and good hard work.

Co-operation with the executives and employees of other departments in the company will produce worthwhile results. They should be given the facts about industrial heating and be fully informed of the heating department's aims, activities and accomplishments. Officials, salesmen and other employees of power companies today have at most only a hazy knowledge of industrial heating applications, yet they are constantly in touch with heating prospects and are asked many questions on the subject. Usually when consulted, they



either dodge the question or give the wrong answer. The better they are informed, the easier will be the path of the heating salesman. Many a good prospect with whom the salesman has spent many months has been lost instantly on the golf course through an ill-advised comment of the salesman's superior. By preaching the doctrine of industrial heating constantly within the company organization the department will soon find itself busier answering calls than soliciting inquiries. Its members will be more frequently consulted and fewer times insulted.

The department will also do well to investigate the heating applications in the company's own shops. Almost all utilities have coil-baking ovens, furnaces, melting pots and other equipment in their repair shops which are fuel heated. The industrial heating department will succeed better if the company practices what it is preaching and sets a good example. Furthermore, these installations can be used as examples when showing prospects successful applications of equipment.

Having sold the company completely on industrial heating, the department can well exert some effort upon contractors, dealers, railways, communication companies and others allied in the electrical industry. Considerably more progress can be made in any community where the entire electrical industry is convinced of the feasibility and practicability of industrial electric heating, than can be made where the industry is only luke warm.

Servicing Equipment

The industrial heating department should service all installations and make sure that they function. Responsible equipment manufacturers usually attend to work of this character, but otherwise the duty falls directly upon the central station company. Failure of a single device terminates revenue, hinders the sale of similar equipment and discourages other future applications of electric heat. It must be remembered in this regard that bad news travels faster than good news. Failures of several ill-advised and poorly-engineered installations already have set back certain large industrial heating installations on the Pacific Coast for many years.

The best procedure to follow in advising a prospect regarding any installation is to offer intelligent and truthful information and to make absolutely sure that only the right kind of installations are made. This is sometimes difficult to do, particularly when a large revenue-producing load is involved. However, the head of the heating department must exercise careful judgment, be diplomatic and courageous, particularly in the face of the competition that will be met from those advocating fuel-burning equipment.

Finally, quick results in the development of an industrial heating load cannot be expected. Over a period of from three to five years any well organized heating department will pay good dividends provided a fair percentage of industrial plants is located in the territory served.

Inter-Group Merchandising Problems

By C. E. Greenwood*

Commercial Director, National Electric Light Association.

THE power company needs friends more than money because the finger of suspicion has been pointed at the utility throughout the hearings before the Federal Trade Commission. I feel certain that when the power company gets opportunity it will justify satisfactorily all acts for which it is criticized. It needs the support of the industry until it is proved that it is not deserving of that support.

The jobber needs a friend because he is confronted with a fight for existence. In some ways he is a victim of his own errors, but more often he has been affected by economic and organizational changes within the electrical industry. Recently the leading manufacturers, being forced to obtain more outlets for their scheduled volume production, have been establishing chains of wholesale outlets. This process has squeezed the "independent" jobber, so-termed, and competition has become more keen in the jobbing field.

The manufacturer has been by-passing the jobber as a means of distribution. In some cases the dealer has done likewise. And numerous mergers of power companies have resulted in large-scale buying for a chain of properties, orders going direct to the manufacturer. The jobber cannot live on odd-lot buying only, and it is not surprising, even if unfair, that the jobber sometimes places part of the blame for the dilemma on the power company.

THE Commercial Director of the N.E.L.A. reviews the merchandising situation, particularly that phase dealing with central station competition. He points to the results of the Joint Trades Conferences and urges that teamwork be developed between all branches of the industry. He offers a sane solution to a problem that has rankled central stations and electrical dealers alike.

In passing, let me state that in my opinion the jobber-wholesaler has an important place in the distribution of electrical material in any community, and I believe that when the jobber is definitely adjusted to new conditions, is operating efficiently and with low warehousing cost, he can show the power company merchant how it will be to his advantage to patronize the community wholesaler, rather than warehouse his own expensive stock.

Now, one further thought as a background to our trade problems. Just as there have been different schools of thought among power company executives on the subject of "Should the power company merchandise?" so there have been varying opinions, within and without the industry, on the *purposes* of the power company merchandising department, and the *practices* it should follow. For many years there has been discord between the power company and the electrical dealer on the subject of merchandising and other commercial practices.

Glowing embers of discontent on merchandise practice are periodically fanned into flame, and in recent months the conflagration in some communities has spread to the general merchandising trades.

* Excerpts from an address at Camp Co-operation VIII, Association Island, Aug. 6, 1928.

The electrical dealer, like the jobber, has been affected by organizational changes. Public acceptance of the smaller electric devices, followed up by able and persistent activity on the part of the manufacturer for wide distribution of his product, has placed appliances in stores of merchants of numerous classes. I venture the opinion that the rapid growth of electrical retail outlets for appliances, and the chain store for wiring supplies, coupled with the manufacturer-to-consumer selling, has had a much greater effect on depleting the business of the electrical dealer than the merchandising practices of the power company. And yet, the prevailing opinion among electrical dealers has been that the power company merchandising operations have been mainly responsible for destroying their business.

There can be no doubt that the merchandising practices of some of the power companies have been and are destructive of competition. How did this happen?

Eliminating Destructive Competition

Do you recall that a few years ago it became the practice of some few of the leading power companies to publish their merchandising losses? The fact is that the losses indicated were not based on standard accounting practice and did not represent a true picture of merchandising operations. However the slogan of merchandise managers became "Cut Down the Red." The jobber was by-passed on purchases which went direct to the factory to obtain the extra 5 per cent. Volume purchases and large stocks started an orgy of high-pressure selling which affected the business of other dealers.

The next step was the commercial awakening of the power company to its low standing in the market place, and the realization that intensified promotion of electric appliances was one sure way of selling more kilowatt-hours. And so there was added another urge for marketing activity. It is a matter of import that during the years from 1922 to 1926 there was a drop of 10 per cent in kilowatt-hours sold per dollar invested in residence service, and although there was an increase of almost one billion kilowatt-hours sold to residences last year, power companies advanced only one-seventh of the distance to their goal laid down at the national convention in 1927 of "One More Kilowatt-Hour Per Day." I would establish the point that there has been an element of self-preservation in the selling practices adopted, but tackling the job with bare fists has cost the power company the good will of the trade in many communities.

Objections Voiced by Trades

Power company advertising has revealed cut prices, premiums, uneconomic terms, and often misleading statements of value. The general merchandising trades unfortunately voiced their objections in their own trade journals, and were not heard until a copy of one of the articles came to the attention of the merchandising committee of the N.E.L.A. We searched for more of these editorials, and in them our real trade problems were revealed. Witness some of these statements, and you can radily grasp the viewpoint. Here is a paragraph of comment from *Hardware Dealer:*

> The theory of rate fixing for utilities contemplates that the merchandising department shall be entirely separated and that no expenses shall go into the general expense fund which were incurred in the sale and installation of appliances. For the utility's expense is a most important factor in determining the rates which consumers pay for gas, electricity, etc.
>
> And it is easy to see that many expenses connected with the sale of appliances may get into this general expense account. The natural result would be that while the utility, according to accurate accounting, is losing money from the sale of merchandise, such a loss does not matter since it is made up by the rates paid.

The *Retail Ledger* of Philadelphia commented editorially as follows:

> If an entire separation of their merchandising and their public utility functions could be brought about, then the central stations, compelled to have their merchandising stand on its own feet, no longer able to dump their merchandising losses upon the users of gas and current, would have to merchandise for a profit.
>
> In other words, from unnatural competitors, with a profit virtually guaranteed, they would become natural competitors and live retailers would no longer have reason to fear them.

The Electragist said:

> For years the electrical contractor-dealer industry has tried to show the central stations, and the jobbers and the manufacturers who encouraged the power companies, that sales activities conducted without regard for profit or for the loss that would result to others were unfair, and in the long run would defeat the very purpose of the utilities. The electrical dealers cannot compete and that constitutes the major reason why a growing number of the better class of contractor-dealers are closing their appliance departments.

There was likewise interesting comment on the floor of the convention of the National Hardware Association. Following the talk of one of the members who challenged the right of the central stations to sell electrical appliances at all, and suggested that a motion for legal steps be taken by the association to prevent the central stations from selling appliances, the president of the association was called upon. He stated that he did not think that the central stations knew any more about merchandising appliances than they knew about merchandising gas and electricity, and in his opinion they did not know how to sell either one!

Another viewpoint, and the most serious criticism to answer, was the angle taken by the representatives of the National Retail Dry Goods Association. Like the furniture dealers, they stated that they were not interested in premiums or cut prices, and the power companies could do as they wished if they could make money by such practices, but they should make money or quit. To quote excerpts from an editorial in the bulletin of the Dry Goods Association:

> Many members of this association have complained of the type of competition they face in the merchandising policies of the public utility corporations They sell appliances because naturally enough they want to increase the use of their own products, gas and electricity. "Building the load" is the term used. Retailers who are worthy the name have no need to fear competition from other concerns, which like their own, must make a profit, but it is impossible to compete with the fellow who doesn't need to make a profit—whole ultimate profit is guaranteed by the state.
>
> In every other field the manufacturer has to undertake the pioneering work himself, and apparently there is no good reason why public utility corporations should dump many thousands of dollars into this work and then charge it back to users of gas and current.
>
> One particularly vicious element in the situation is that under the system the very retailers who must accept the competition in merchandising of the central station are obliged to help pay the merchandising losses of their competitors, for retailers are large users of light and power.

These references make clear the questions at issue, first the broad ones of "Should the power company merchandise?" and "Are the substantial losses in selling operation due to lack of merchandising brains?" Secondly, we have an outline of merchandising practices which are objectionable to the hardware jobbers and retailers, and the Electragists.

Outcome of Conferences

As you know, there were joint trade conferences called by the merchandising committee of the N.E.L.A. —three of them—with representatives of six associations present, in addition to the N.E.L.A. representatives. The attitude of these gentlemen was at first vindictive. They aired their grievances and gave free expression to their views on the policy, as well as the right of the power company to merchandise. Exhibits of advertising revealed a flood of examples of cut prices, premiums and uneconomic terms by both power company and independent dealer. The power company advertisements were centered in a few communities and justified criticism. Terms that were, and are now, uneconomic, were also revealed.

It was not difficult for unprejudiced minds to get together on a solution of these problems of details in operation, but early in our deliberations it was evident that the general merchandising trades did not understand the nature of the utility business, or power company promotional effort, and the intricacies of accounting practice offered even a more complex problem for solution.

Central Station Merchandising

It is too easily said that the power company merchandising manager does not know how to merchandise, and it is suggested that the companies would do well to hire expert merchandisers from the department store field. I can conceive of no greater error (unless there is a complete reversal of policy in the power company). The "expert merchandiser" from the department store would exist in the utility company perhaps one week, if he carried on his shoulders the restrictions of some companies. On the other hand, with the prices, terms and conditions that certain power companies offer, an "expert" is not needed. Merchandising becomes only a title for a form of distribution and there can be no pride in obtaining startling volume when no attempt is made to show a profit in operation. Please bear in mind that this reference is to general practice and not to occasional "leader" sales.

Now it is unfortunate for the power company that there are not standard accounting systems for merchandising operations, and furthermore that the "profit figures" usually do not give a true picture of selling activities. The independent merchant is interested in our "figures" as they tell of the losses. These figures are not facts of selling operations as the independent merchant understands the term "selling," for the power company's merchandising department carries pioneering expenses, broad promotional and advertising expenses of a "service" as well as material, and policy accounts not common to the independent dealer, and yet incurred for the indirect benefit of the dealer through broadening the market for his wares.

Just because the power company doesn't do a constructive and profitable job in selling now, is no reason to believe that it cannot be done. My experience assures me that it can be done, but with difficulty. The merchandise manager must have that particular job to do, and nothing more; he must be capable; he must have executive backing in obtaining the most efficient service from other departments serving the merchandising department, and in establishing practices common to the business.

At once you say in your mind, "It is not possible." However, I am optimistic that more attention is to be given the requirements of the power company merchandiser, that accounting systems are going to be standardized, or some definite action will be taken to establish the merchandising branch of the business on a sound economic operating basis.

The inter-trade problems are internal with the trades themselves, as well as between trades. We are only getting a fair start on our way to solving it.

Representatives of other trades at the joint trades conferences learned much about the power company problem. And that broad-gaged minds represented the trades is indicated in their recognition of the leadership of the power company in merchandising, if constructive, and the fact that they were signatory to the "Declaration of General Merchandising Principles" which have been distributed.

To fur her crystalize discussion on the subject of merchandise practice and clarify the intent of the general merchandising principles, the suggested merchandising standards were developed by the general merchandising committee, as a guide to members of our association.

Here is evidence of teamwork, and teamwork in merchandising I submit is one answer to our inter-trade problem. The preponderance of opinion on the subject of whether the central stations should, or should not merchandise, is in the affirmative—they should. The power company not only has a legal right, but a duty to merchandise. Furthermore, the Kansas Supreme Court in a recent decision affecting the Wichita Gas Company has reversed a decision of the Kansas commission, and allowed the losses in merchandising by that company to be charged against "operation." The court takes the position that the sale of appliances is not so much "merchandising" as it is an effective means of increasing the sale of current.

Teamwork Is Essential

Let me reiterate. The answer to the inter-trade problems is in teamwork. In the electric family this may take the form of direct-contact selling between power company and dealer, as in the San Joaquin Light & Power Corporation in the West, or the Boston Edison plan in the East. The California company organizes a subsidiary and pays a definite amount per kilowatt for load-building service. And let me emphasize, that considering the amount paid for that load-building as fair (and the plan seems to be accepted by the electric trade as ideal, and the amount paid as fair) then the losses sustained by the merchandise department of the power company are not as bad as they are pictured. The power company competitive selling practices are the crux of the problem because they affect the independent trades in other lines.

It is my personal opinion that the power company and the trades are so closely allied in the sale of appliances that the power company—not through any legal obligation or other pressure but solely from a desire for more business, encouragement of outlets, and a sense of willing teamwork—will prevent destructive selling practices from maintaining. Monopoly of the electric appliance field would ultimately work to the disadvantage of the power company.

Problem Is Now Local

Seven associations are now signatory to the "Declaration of Merchandising Principles." No association can exercise police power over its membership. Therefore, our inter-trade problem now becomes a local issue and I can conceive of no more appropriate medium for effective accomplishment than the local electrical league.

We have had evidences of teamwork in the study of the wiring situation which is now in progress through tht Industry Sales Conference; we have had, and there is now being planned, teamwork with groups interested in lighting; and now there is glorious opportunity for local teamwork in merchandising.

With few exceptions, there is no reason why the power companies cannot forge ahead under the standards suggested and constructively build a market for all those interested in the sale of electric devices in the community. These principles are the answer to a complex problem. They are an answer in so far as they are the first definite step in focusing attention on the shortcomings of our power company merchandising policy, the vital need of better accounting methods, and of the final establishment of a sound basis on which to build our business.

"Latch Key" Cleaner Campaign Success for San Diego Utility

"GOING over big," is the latest report of Edwin W. Meise, superintendent, merchandising department, San Diego Consolidated Gas & Electric Company, with reference to a special sales campaign of the "Happy Premier Family" now being conducted by the San Diego utility company. The campaign opened Sept. 4 and closes Oct. 6.

No detail has been overlooked to create a desire to buy on the part of the public and a desire to sell on the part of the salesman. An advertising program of considerable proportion is being carried on to include daily and weekly newspaper advertising, highly colored signs on transportation equipment, and the successful "key" system originated by the manufacturer—that of hanging a large pasteboard key on the door knob of a prospective customer bearing a printed message calling attention to the campaign with the suggestion that the "latch key be out" for Premier cleaner salesmen. These were distributed by high school students prior to the visit of the salesman.

The San Diego company is carrying on a continued story telling of the distinguished features of each member of the "family" with each advertisement repeating the special sales inducements of the campaign.

With each Premier Duplex sold complete with attachments the San Diego company is giving an air spray gun attachment with the added inducement of a low $5 down payment. The Premier Junior is being featured as the best buy of the campaign. A $5 motor-driven floor polisher attachment is given with each Junior sale. A $4 down payment with twelve months to pay the balance are added inducements to buy during the limited period.

To encourage the designing of the best window displays possible, C. J. James, district representative of the Premier Service Company, offered a substantial cash prize for the best display. A number of cash prizes are to be given the salesmen participating in the campaign based on a point quota system, the scoring to be as follows:

For each Premier Duplex sold the salesman will be credited with	12 points
For each Premier Junior sold the salesman will be credited with	8 points
For each Premier Pic-up sold the salesman will be credited with	4 points
For each Premier Duplex floor polisher	2 points
For each set of Premier Duplex attachments	2 points

On this point basis the following quotas were established:

District	District Quota	Salesmen Quota
San Diego	3,550	200
Oceanside	200	175
Escondido	200	175
La Mesa	200	175
Coronado	200	175
La Jolla	200	175
National City	200	175
Chula Vista	200	175
Capistrano	50	-----
Total points	5,000	

A weekly quota of 40 points was established for each salesman and the following cash prizes awarded on the quota basis:

A cash prize of $5 to be paid each week to each salesman selling the greatest percentage over his quota for that week.

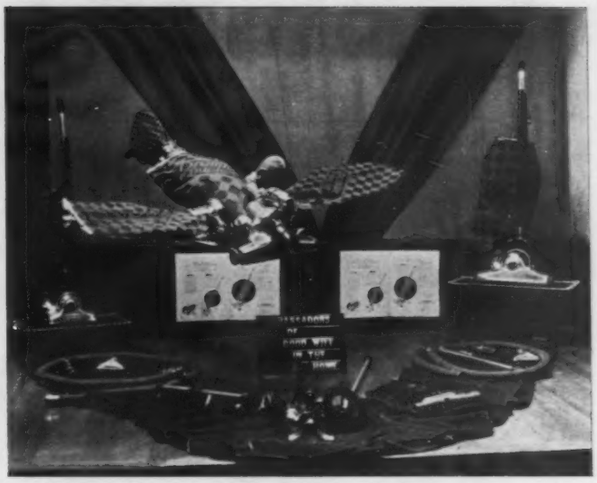
A cash prize of $10 to be paid to the first salesman to reach his quota.

Another cash prize of $10 to be paid to the salesman showing the greatest percentage over his quota for the period of the campaign.

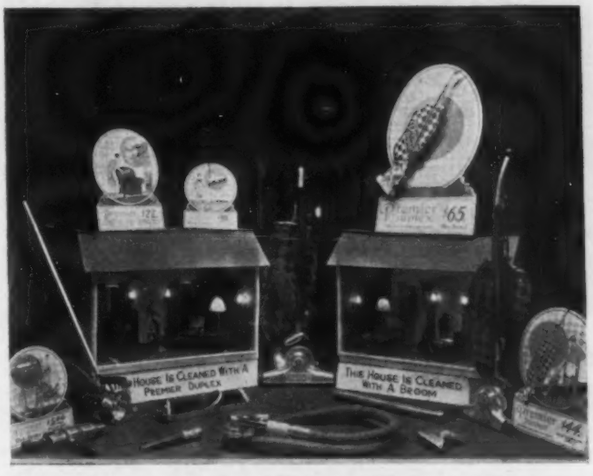
In addition to the above cash prizes, each salesman making or exceeding his quota will be paid 10 cents per point on each point scored during the period of the campaign.

This system of prize awards was arranged primarily to encourage the salesman not only to reach his quota, but to go over the top as quickly as possible.

The co-operation of all employees of the San Diego Consolidated Gas & Electric Company was solicited through a personal letter prepared by A. E. Holloway, superintendent of the company's commercial department, offering $1 to every employee turning in a Premier Cleaner prospect which results in the sale of a cleaner.



Prize-winning window at the La Jolla office in the company's previous vacuum cleaner campaign.



Prize-winning window at the La Mesa office in the previous campaign.

This
comfortable sunny warmth
now costs only
1½ to 3½¢ an hour
IT FORMERLY COST 5 TO 6¢ AN HOUR
The kind of quick, convenient heating you've always wanted. Instantly ready when and where you want it—
Fine for the bathroom
The morning shave
Dressing
The breakfast nook
Drying hair
The children's playroom
When you don't want to start a fire
—or any place in the home during chilly mornings or evenings in Winter, Spring, Summer and Fall.
The reduction in electric heating rates effective April 1st, 1928, means you can use a portable electric heater unsparingly the whole year 'round.
Get your electric heater NOW and enjoy it
PG and E Cooperative Display Card

Co-operative heater display card for use in company office displays and dealer stores.

Utilizing Employees to Build Residential Load

By E. F. Perkins
Appliance Sales Engineer, Pacific Gas and Electric Company, San Francisco.

THE ELECTRIC appliance load-building sales activity of the Pacific Gas and Electric Company calls for the addition of 81,320 kw. to the lines of the company during 1928. This quota includes 4,700 electric ranges, 2,400 electric water heaters and 36,220 kw. of electric air heating.

The reduction in electric rates on March 1 and April 1, with the establishment of the new domestic schedules, opened a new field of electric heating. This field has been termed that of "auxiliary electric heating." Heaters of 1,000 to 1,250-watt capacity which can be operated from baseboard 115-volt outlets were selected for sales concentration.

The year's sales plans call for continued sales activity, with special campaigns during limited periods to further stimulate sales. The first campaign was on auxiliary heating, and was more or less a test campaign to determine the best method of procedure for fall. During the spring campaign, a quota of 1,500 1-kw. auxiliary heaters was set, with sales results up to July 1 totaling 5,006 heaters. An important feature of this campaign was the soliciting of the support of all company employees in the direct sale of these heaters.

The second campaign was conducted on Hotpoint electric ranges during the period of April 30 to June 23. A quota of 560 ranges and 280 water heaters was set, with resulting sales of 1,142 ranges and 386 water heaters. Employee co-operation was again solicited in this campaign and played an important part in its success. A third campaign featured electric water heaters during the period from July 2 to Sept. 1, with 389 ranges and 241 water heaters sold. This campaign was designed to forestall a slump in sales immediately following the Hotpoint campaign.

On Sept. 24 the largest special appliance selling campaign in the company's history was launched. This campaign carries a direct sales quota of 15,600 kw. for the period Sept. 24 to Dec. 22, inclusive. This quota consists of auxiliary electric heaters, electric ranges, electric water heaters and heavy duty electric heaters. While this campaign includes the sale of all the appliances mentioned, sales advertising and publicity will be concentrated on auxiliary heaters and electric ranges.

The company appreciates the value of employee co-operation, and in all campaigns during this year this opinion has been justified, especially with the reward that has been paid for this co-operation. During this closing campaign employees will be paid a commission of from $1 to $1.25 on the sale of auxiliary heaters and a bonus of $2.50 for each electric range or water heater prospect that is closed during the campaign period.

The campaign quota has been divided among divisions which will compete for the R. E. Fisher trophy to be presented to the division manager whose division accomplishes the highest percentage of quota during the campaign, and the H. M. Crawford trophy, which will be presented to the division sales manager whose division is first in attaining its quota. A Christmas bonus has been provided of 10 cents per kilowatt, which will be paid to individual salesmen or employees for their sales provided their division exceeds its campaign quota. Premiums have been provided which are offered to employees other than those regularly employed to sell auxiliary heating only, for their individual sales, a premium being determined by the number of heaters sold. A premium has also been provided to be presented to employees who submit three or more electric range prospects which are closed during the campaign.

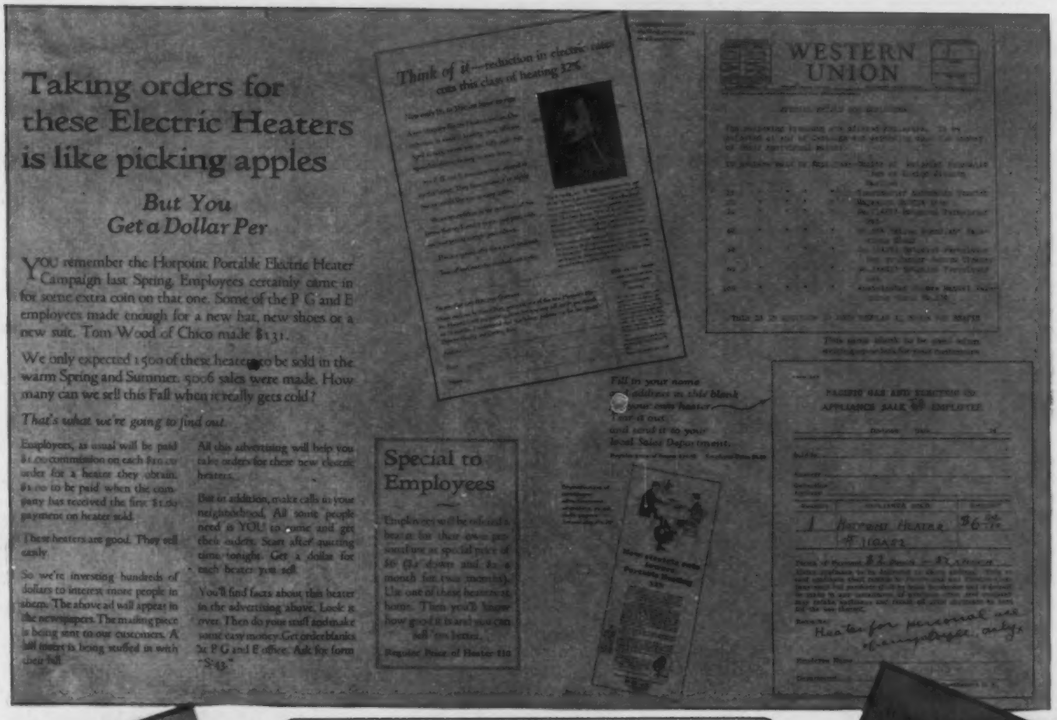
In addition to employees' selling of auxiliary heating, a crew of 50 salesmen will devote its exclusive time to the sale of auxiliary heaters. Three prizes valued at $450 will be awarded to the high three salesmen.

The regular electric range salesmen will compete for three prizes valued at $450 to be awarded to the three salesmen selling the most Westinghouse electric ranges during the campaign.

This campaign is rounded out with a well designed advertising campaign which is divided into three classes. The first class is a series of broadsides which will be mailed periodically to all company employees. The second class consists of consumer broadsides on the Hotpoint and Wesix auxiliary heaters and on Westinghouse electric ranges. The third is newspaper advertising on auxiliary heating, electric ranges and reduced rates.

The success enjoyed by the company in the preliminary test campaign on auxiliary electric heaters early in the year when 5,000 heaters were sold has demonstrated that the public is becoming conscious of the advantages and economies of electric heat. The company feels that those customers who enjoy the comforts and conveniences of one of these small heaters will prove excellent prospects for complete electric heating installations at some future time. Thus the number of electric air heating prospects is increased from approximately one in 100 customers to 40 or 50 in 100.

Experience with past campaigns has indicated that dealers profit immeasurably from intensive selling drives such as the one just undertaken. Reports from jobbers indicate that dealers are able to cash in on the interest aroused by such a campaign for months after its completion.



Taking orders for these Electric Heaters is like picking apples

But You Get a Dollar Per

YOU remember the Hotpoint Portable Electric Heater Campaign last Spring. Employees certainly came in for some extra coin on that one. Some of the P G and E employees made enough for a new hat, new shoes or a new suit. Tom Wood of Chico made $131.

We only expected 1500 of these heaters to be sold in the warm Spring and Summer. 5006 sales were made. How many can we sell this Fall when it really gets cold?

That's what we're going to find out.

Employees, as usual will be paid $1 commission on each $10 order for a heater they obtain. $1.00 to be paid when the company has received the first $1.50 payment on heater sold.

These heaters are good. They will easily

So we're investing hundreds of dollars to interest more people in them. The above ad will appear in the newspapers. The mailing piece is being sent to our customers. A bill insert is being stuffed in with their bill.

All this advertising will help you take orders for these new electric heaters.

But in addition, make calls in your neighborhood. All your people need is YOU to come and get their orders. Start after quitting time tonight. Get a dollar for each heater you sell.

You'll find facts about this heater in the advertising above. Look it over. Then do your stuff and make some easy money. Get order blanks at P G and E office. Ask for form "S-43."

Special to Employees

Employees will be offered a heater for their own personal use at special price of $6 Cash down and $2 a month for two months. Use one of these heaters at home. Then you'll know how good it is and you can sell it better.

Regular Price of Heater $16

Fill in your name and address in this blank and mail it to your local Sales Department.

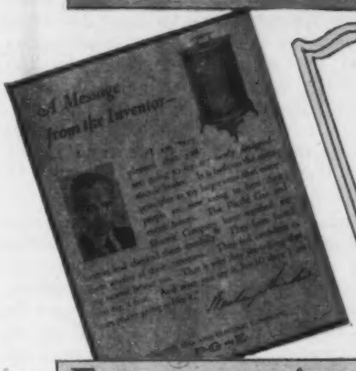
WESTERN UNION

PACIFIC GAS AND ELECTRIC CO. APPLIANCE SALE TO EMPLOYEE

1 Hotpoint Heater $6.00

$10.00

Heater for personal use of employee only.



Attractive Advertising Material Used in Campaign

INTEREST of employees in the Kilowatt Campaign was aroused by the above folder which was sent to the 10,000 employees. The folder also contained an order blank for use of the employees in purchasing a heater. On either side are portions of the address stickers used in sending out the heaters. Parcel post delivery was used except in the Bay region. Below is attractive direct-mail folder mailed to all domestic consumers.

Frosty mornings and chilly evenings you'll be delighted with this electric heater

Here is the newest of the Westx heaters that the Pacific Gas and Electric Company highly recommends. It is called the Westx "Cent-a-Watt." It heats the air in the room. That is why the Westx heaters are called practical.

Notice how beautifully this portable electric heater is designed. All the metal is aluminum and it will not tarnish. It is light in weight. And yet it sells for such a low price!

Fine for the bath

Gives Quick Heat Anytime

This heater gives an abundance of warm air that heats small rooms.

In the bathroom this heater warms you all over. In comfort you'll briskly rub yourself dry.

The early riser who doesn't like to start a fire will like the Westx heater. It gives quick warmth without using oxygen.

Before lunch at

The few minutes your family is in the breakfast nook can be cozy minutes. The heat spreads evenly and circulates about the room.

Mothers like this heater for the children. It's absolutely safe. It's fine for drying hair. It dries clothes on rainy days. It's nice when you want a little heat without starting the furnace. Or when you come home cold late at night. Although designed to heat small rooms, it can be used in any room.

Facts That Men Appreciate

The heating element is made of Chromel A Wire. The wire is wound around a chimney like vertical core through which the air rises, heats and circulates throughout the entire room. No special wiring required. Plugs into a Convenience Outlet. One can splash water on it, yet it doesn't burn out. It meets the whole room temperature. Approved by the Underwriters' Laboratories and the National Board of Fire Underwriters. Every detail of construction and design is covered by patents. It's the only heater of its kind. It is 9x15 inches high. Equipped with 6 feet of cord.

Qualifies You for Special Low Electric Rates

Our new low electric rates are now in effect. Those who have one or more of these new Westx heaters are qualified for our *Special Domestic Heating and Cooking Rate*. This is a still lower rate. That makes this heating cost 33⅓ less than formerly or 3½c to 1½c per kilowatt-hour.

PACIFIC GAS AND ELECTRIC COMPANY

P · G · and · E ·

Owned · Operated · Managed by Californians

Trial Offer

We are so confident in the excellence of the Westx "Cent-a-Watt" electric heater that we'll send you one post-paid without your paying a single penny down. We want you to test this heater in your own home first. And we'll offer it to you for a 10-day trial if you'll return the attached card today. Then if this heater doesn't do all we claim for it we'll take it back and you are not obligated in any way. Jot down your address and name on the post card attached here for your convenience. The heater will come by return mail.

Convenient form of heater

Fill out and mail this card today or bring it to our office when you come down town

PACIFIC GAS AND ELECTRIC COMPANY

GENTLEMEN:

Send me the Westx "Cent-a-Watt" electric heater, post-paid. If I keep the heater you may bill me $1.75 a month for 10 months. I am to try out the heater for 10 days. If I do not keep it I will return it to you without further obligation.

I understand that this heater qualifies me for your Special Domestic Heating and Cooking Rate in my home.

Address

Name

City

Engineering Practice

Organization—the Keystone of Efficient Management and Operation

A Plan for the Building of a Utility Distribution Department

By R. G. BOYLES, Superintendent of Distribution, Southern California Edison Company, Los Angeles

IN THE utility business, as in every other important business, the keystone of success is organization. Andrew Carnegie, the noted industrialist, when asked what he considered to be the most important part of management, answered, "If I had to choose between abandoning my present organization and burning down all my plants which have cost millions, I would choose the latter. My plants could be built in a short time with borrowed money but I hardly could replace my organization within a generation." Obviously a properly working organization consists of an association of individuals, each with his distinct duty to perform and all working together for a common end.

The proper organization of any department and consequently of the utility itself bears a most important relationship to the successful operation of that utility's properties. A recent ruling of the Idaho Public Utilities Commission emphasizes the value of proper organization: "In valuing the properties of a public utility, an allowance shall be made for organization, which is a value attached thereto resulting by reason of such organization." It is a natural but an expensive tendency to permit the various departments and divisions to be added to in a small way from time to time and in an unsystematic manner as the utility company's business grows and the demand on the particular department becomes heavier.

While it is impractical to set up an organization scheme in any department and consider it to be the one and only ideal outline for the operating of that particular department, it is highly important that a department head have a definite organization outlined, one which can be used as a guide for intelligent growth as company and department business expand. Equally important, of course, is the necessity of avoiding over-organization with its resultant "red tape."

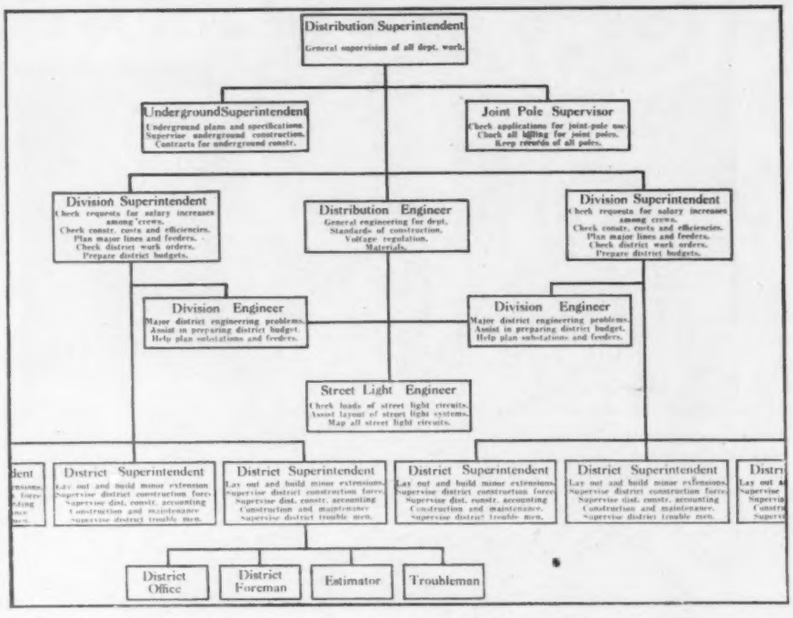
Probably the most difficult phase of the building of an organization is the selection of the personnel. This is a detail that should be given the most careful study, particularly before placing men in important positions. If a man be placed in a position of responsibility and fail to render the best service of which he is capable, it is not difficult to remove him. However, if the man be an honest, conscientious employee but unfitted for the position in which he has been placed, the problem is quite different and the situation difficult.

The organization scheme shown in the accompanying illustration is a suggested scheme for a distribution department and one the worth and workability of which has been proved. In this scheme and in the following discussion of it the distribution department is considered to be the department responsible for the delivery of electrical energy at the proper voltages from the company's substations to the consumers' meters.

District Organization

In setting up an organization of this kind the character of the territory to be served must be studied carefully and the area properly subdivided into divisions and the divisions again subdivided into districts according to local conditions. The size of a district that can be handled satisfactorily by a district superintendent naturally depends upon the character of the country as well as upon the population, and in fixing boundaries consideration must be given to natural obstacles which may interfere with transportation. All parts of the district should be accessible from the district office because construction costs are affected materially by the traveling time of crews and trucks between their base of operation and jobs. Population is of secondary importance in determining district size and might vary from 1,500 in a rural district to perhaps 60,000 in an urban district.

Under the superintendent in each district of course there must be the necessary office held to handle accounting, payrolls, materials, records and other necessary office routine, these in addition to the forces engaged in distribution construction and maintenance. The district superintendent is responsible



Organization plan for a distribution department of an electric utility.

for the entire distributing system within his district and to handle his work successfully must be a man of more than average ability. The district superintendent daily comes into direct contact with the public and must handle diplomatically all service and other problems as well as superintending and engineering the construction and maintenance of distribution lines within his district.

Division Organization

Where the territory served is of sufficient size to require many districts it naturally will be impossible for the (general) superintendent of distribution to give proper direct supervision to field work. For this reason it is advisable under these conditions to group together a number of districts to form a division, each division under the direction of a division superintendent of distribution. The proper size of the area within a division depends largely upon local conditions. The division superintendent does not come into as close contact with the field work nor with the public as does the district superintendent, but he must be a man of even greater experience and training to supervise and co-ordinate in an intelligent manner the work of several districts. Through the division superintendents, the superintendent of distribution is kept informed and in general touch with district work, but most of the detail is handled by the division superintendent. The division superintendent assists the district superintendents in planning major jobs and acts in an advisory capacity for all distribution matters arising within his districts. Also he assists in preparing the annual budget.

Major projects within a given district involving more than minor engineering problems are referred to a division engineer assigned to that work who reports to the division superintendent and to the distribution engineer. Matters referred to the division engineer are worked out in the general office, where the division engineer has his headquarters. This is important in that it facilitates the carrying out of well co-ordinated plans for expansion and development.

The division engineer keeps abreast of studies for future development and keeps the district superintendents advised so that any reconstruction or new construction within the districts can be made to conform with any general plans that have been adopted. Where this scheme is not used it has been found that within the district one little extension after another will be added to pick up new business as cheaply as possible, but that ultimately all of these extensions will have to be town down and rebuilt to accommodate plans for general expansion. These inefficiencies must be written off as operating charges while if the line had been properly built in the first place, even though requiring a larger expenditure, the money could have been capitalized and the company thus allowed to earn on its investment.

Distribution Specialists

The distribution engineer co-ordinates the work of the division engineers and reports directly to the superintendent of distribution. The division engineers report both to the distribution engineer and to the superintendent of the division in question as it has been found that this double affiliation permits much closer co-ordination of effort. The distribution engineer is in touch with all of the general problems of the distribution system and in addition to this is responsible for all material such as poles, crossarms, wires, transformers and other material, serving the district superintendents as the authority in this regard. Proposed changes in construction within any district should have the approval of the superintendent of distribution with recommendations from the distribution engineer. Voltage regulation is another very important problem often requiring the service of an engineer who does nothing else but study the problems related to voltage regulation, reporting directly to the distribution engineer.

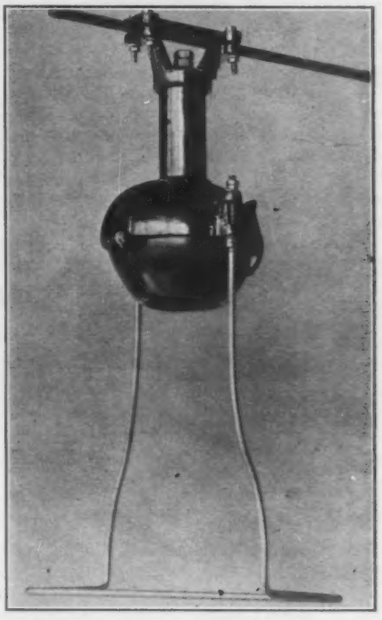
Where a great amount of street lighting is taken care of on the distribution system, the services of a street lighting engineer who devotes his time to this phase of the work will be found to be an advantage. He should be responsible for the laying out of street lighting systems and should assist the city engineers of the municipalities served, reporting directly to the distribution engineer.

Elimination of unnecessary poles from streets and highways saves the utility company a great deal of public criticism. In territory served by more than one utility the common practice of joint pole use not only eliminates unnecessary poles but results in construction economies worthy of consideration. Where the amount of this joint pole business is large enough at all to warrant it, it is advisable to place a properly trained man as joint-pole supervisor devoting his time to this work and reporting directly to the superintendent of distribution.

Since underground construction differs so widely from overhead construction it is logical to have a superintendent of underground in charge of such work under the distribution department when the utility operates any appreciable amount of underground system. Within any one district where there is a large amount of underground work it will be necessary to maintain an underground crew in charge of a foreman thoroughly familiar with underground construction and serving as a part of the district's organization. In districts having only a limited amount of underground construction the work can be cared for by utilizing the crews of other districts or by having a traveling underground crew. It is important, however, that a superintendent of underground construction should be in charge of all underground work, reporting directly to the superintendent of distribution.

The subject of construction and operating cost is one which should be given very careful consideration, and is a subject which is very interesting to the management of any public utility. The district superintendent should prepare an estimate of his construction and operating costs for at least one year in advance. These costs can be divided between new construction, rebuilding and direct operating charges. In this manner it is possible to check the costs for adding consumers to the line, as well as the operating costs to take care of each consumer during the year. This method is a splendid check on the efficiency of the districts, although the costs will vary considerably according to the character of the business served and the number of consumers in the districts. If this method is followed over a period of years, it will be the means of furnishing very valuable information not only to the distribution department, but to the management of the company. A convenient method for keeping records of this kind is by plotting curves for each account, showing the charges month by month from figures compiled by the accounting department.

A Static-Glow "Voltmeter"



A simple commercial device for indicating potential on high-tension transmission lines at points where no potential transformers are used is provided by this recent Westinghouse development. The voltage detector consists of a vacuum-type static-glow lamp mounted in standard fuse clips and enclosed in a metal case having a glass window. This device is suspended from the line conductor by a clamp in such a manner that the lamp is visible from the ground. One terminal of the glow lamp is connected to the line conductor through the clamp and the other is fastened to a brass rod antenna suspended from the detector case. The detector is designed to operate on line voltages from 4.5 to 220 kv.

Steel-Tank Mercury-Arc Rectifiers Replace Rotary Converters

By W. C. FOSTER, Assistant Operating Engineer, Portland Electric Power Company, Portland, Oregon.

ABOUT the latest thing in d.c. supply equipment is the steel-tank mercury-arc rectifier for heavy duty railway and power service. For more than a year the Portland Electric Power Company has had in operation two such units each rated at 750 kw., 1,400 volt, 535 amp., serving the trolley feeder system of the Oregon Electric Railway Company. These new rectifiers were installed in the Jefferson substation at Portland, replacing the old 33-cycle rotary converter installation at Multnomah substation and are a part of the company's program for changing its 33-cycle system over to 60 cycles.

Some of the outstanding features of this type of rectifier are simplicity of operation, high momentary overload capacity, low weight, absence of rotating parts and noiseless operation. The set is started by closing the auxiliary switches, the a.c. switches and the d.c. line breakers. There is no synchronizing, no chance of wrong polarity, no adjustment of voltage and no adjustment of power factor. The load handling ability of the set is most flexible in that it will pick up instantaneously from no load to 100 per cent overload when the necessity arises. This type of equipment can be placed in stations where rotating machinery would be extremely objectionable to adjoining property holders and the low weight and absence of rotating parts permit appreciable saving in foundation construction.

The units are kept under constant vacuum, whether in service or not, through the operation of a motor-driven vacuum pump. When the rectifier is in service the small motor-generator set also is in operation to furnish the power necessary for striking the arc. An automatic relay cuts in the striking arc when the load current on the rectifier falls to the level of about 100 amp. Cooling water is supplied continuously during operation to cool the tube tank and the vacuum pump.

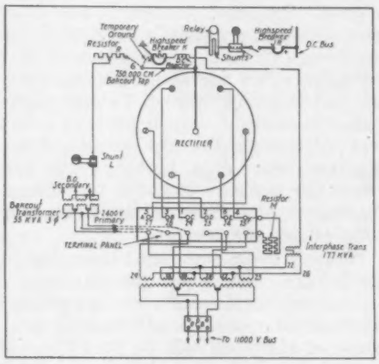


Fig. 1. Connection scheme of mercury-arc rectifier equipment.

When the rectifier unit is operating on light loads the heater units on each anode are kept in service to maintain a minimum temperature at the anode. When the unit is carrying full load these heaters may be cut out of service. These heaters are fed by two 450-watt, 220-volt transformers.

An automatic safety cutout device attached directly to each of the two gates into the rectifier enclosures instantly de-energizes and removes from service the rectifier equipment upon the opening of the gate. This is an important safety measure because the steel-tank rectifier equipment is operating at a relatively high potential and is insulated from ground thus constituting a definite hazard unless thus protected. It is impossible for a person to enter the enclosure without de-energizing the equipment unless he were to climb over the fence.

Flashovers may occur and in fact do occur now and then. Most of these are due to outside trouble and are not serious. If continual flashovers occur it is a signal that the tank should be opened and inspected. As a matter of routine, it is expected that these tanks be opened for general inspection at least once a year on general principles.

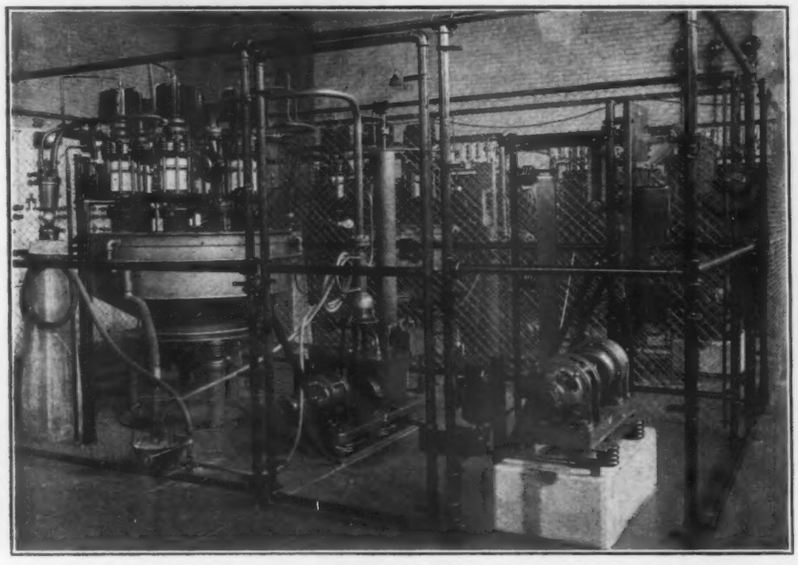


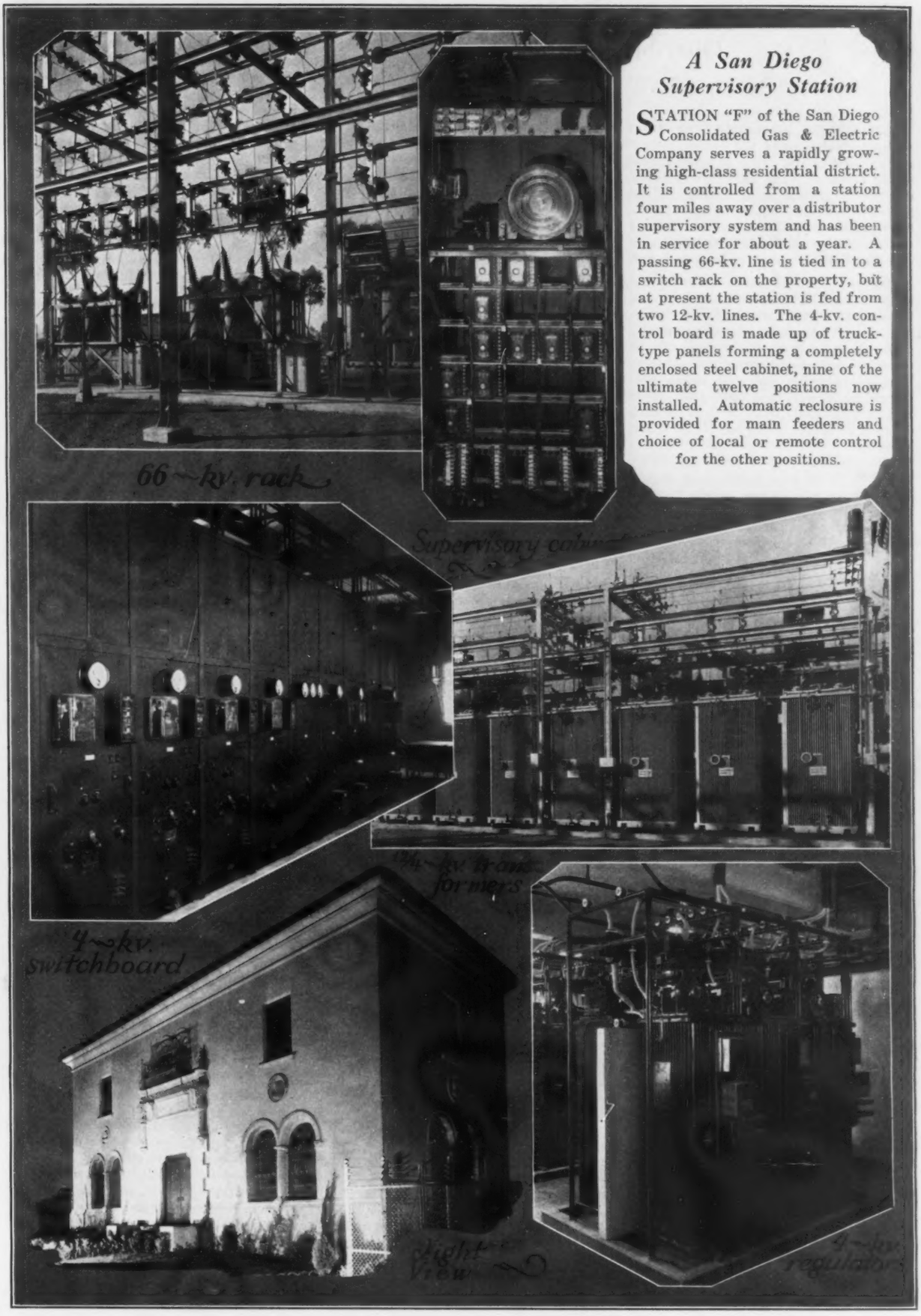
Fig. 2. One of the two 750-kw., 1,400-volt, steel-tank mercury-arc rectifiers in service at the Jefferson substation of the Portland (Ore.) Electric Power Company. This view was taken before the protective wire netting was placed around the equipment. The high-tension cable riser may be noted at the left, connecting directly with the rectifier. In the center is the motor driven vacuum pump and at the right the motor-generator set for striking the arc. The equipment is controlled entirely from a switchboard panel.

Giving a Workman Three Hands

There is an interesting little how-to-do-it kink illustrated in the accompanying photographic reproduction which shows a lineman driving a ⅝-in. Copperweld ground rod. To insure that the rod will be driven straight and to simplify the driving, the linemen for a prominent Illinois telephone company have evolved a simple little holding device that may be seen opposite the lineman's knees. This device is simply a wooden block, a 4-in. piece of "2 x 4," into which has been driven part way a 2-in. staple. This staple-equipped block then is attached to a 4-ft. strap taken from an old, worn-out belt harness.

A "strap-on" holder which greatly facilitates the driving of ground rods.

In driving the ground rod the lineman simply slips the staple over the rod and straps the staple block to the pole, holding the rod in a convenient driving position and freeing both hands.



A San Diego Supervisory Station

STATION "F" of the San Diego Consolidated Gas & Electric Company serves a rapidly growing high-class residential district. It is controlled from a station four miles away over a distributor supervisory system and has been in service for about a year. A passing 66-kv. line is tied in to a switch rack on the property, but at present the station is fed from two 12-kv. lines. The 4-kv. control board is made up of truck-type panels forming a completely enclosed steel cabinet, nine of the ultimate twelve positions now installed. Automatic reclosure is provided for main feeders and choice of local or remote control for the other positions.

Ready-Reference File Cabinet for Distribution Maps

By H. H. Buell, Superintendent Electric Distribution, Pacific Gas and Electric Company, San Jose, Calif.

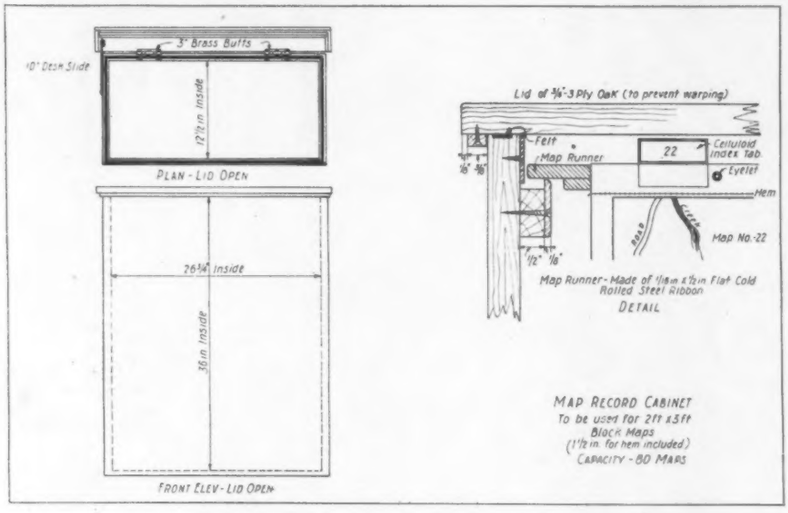
IMMEDIATE accessibility to every individual map in the entire cabinet is provided in the filing cabinet shown in the accompanying illustrations. The equipment shown is in service in the San Jose, Calif., office of the Pacific Gas and Electric Company, and is used for the filing of electric transmission and distribution system reference maps.

The operation of many utilities and large industrial concerns requires the keeping of certain continuously changing record drawings or maps, usually approximately 2 x 3 ft. in size. To be effective such record drawings must be readily accessible and still amply protected when not in actual use. It is almost universal practice to bind such records in large books or binders, but there are several objectionable features in that system. Such books are bulky and difficult to handle and it is impossible for more than one person to work on or view any one book or group of maps at any one time, a feature which hampers effective use of the reference maps. Further, when thus bound, even though tabs may be used on individual pages, the pages generally are turned by thumbing the corners which soon destroys the records in that portion of the page, a very serious matter in many instances. Even the common commercial type of cabinet which provides large envelopes in which the drawings or map tracings may be placed, were found to be not sufficiently flexible where such records are constantly and regularly referred to.

In an effort to overcome the difficulties presented in most of the common methods of filing, the improved cabinet and mounting method was developed as illustrated herewith. The cabinet is of sufficient size to permit each individual map to be freely suspended inside of the cabinet, and, as may be noted, the design and construction details are simple and the cabinet itself, inexpensive. The top is hinged and arranged to fit very tightly, making the cabinet dust-proof.

To permit the most efficient use of the storage area provided in the cabinet, the "map runners" on which each tracing is mounted are made from thin, cold rolled steel strips, 1/16 in. thick by ½ in. wide. This provides maximum rigidity and strength with minimum thickness. The tracings are sewed double along one end providing a channel through which the map runner is slipped and the tracing is held in place on the runner by means of flat eyelets passing through holes drilled for them in the steel strip. A celluloid tab is attached to each runner to provide ready identification of each tracing. Construction details are shown clearly in the accompanying illustrations. The dimensions in this particular case, of course, were governed by the dimensions of the reference tracing to be filed and could be changed to suit any other dimension necessary.

Cabinet built into drawing table.



Construction details of handy map cabinet.

In the particular case illustrated the record tracings involved are the maps of distribution lines, each covering an area of approximately 30 miles long by 20 miles wide. For convenience in the use of the cabinet it is mounted in the center of one side of a long drawing table which provides space upon which may be spread out two or three of the reference tracings at one time. Under a sheet of glass directly in front of the filing cabinet is a key map which gives the file number of any particular section map that may be desired. For convenience, the key map of a small area extending outside of the limits of the main key map has been mounted on the inside of the cover of the cabinet and protected by a sheet of celluloid. As in any modern filing system, the tabs on the individual maps are staggered in regular order to facilitate selection.

Emergency Suppression of Radio Interference

Not infrequently cases of power-line trouble develop which are so complicated and involved that it takes a long time to search them out and apply the necessary corrective measures. In the meantime the disturbance may be carried out to residential areas over primary and secondary distribution lines, causing so much interference to radio reception that it becomes imperative to resort to some temporary and immediate relief that will suppress the disturbance as far as the residential area is concerned while the hunt for the major source of the trouble may go on more or less indefinitely.

There is on record the case of a Western utility which was faced with just such a situation. The utility has a certain 2.3-kv., three-phase distribution feeder which is carried for some distance on the same poles that support a 66-kv. Y three-phase transmission line. The area served by this particular 2.3-kv. feeder suffered very severe radio interference, and tests carefully made quickly disclosed the fact that the trouble was being picked up by induction from the 66-kv. transmission line where the two lines were carried on the same poles.

Two baffling conditions presented themselves, the first of which was the fact that the noise level along the 66-kv. transmission line itself, as measured by a 7-tube superheterodyne receiving set (fitted with an output transformer and a radio-frequency galvanometer having a full-scale reading of 100 divisions) was only a nominal amount while tests made on branches of the 2.3-kv. feeder showed the noise level to be so high that the galvanometer pointer was thrown hard off-scale. The second baffling feature was the fact that a very careful search for all possible troublesome conditions, in-

cluding loose connections and improperly fitted line hardware on the transmission line as well as along the distribution line failed to disclose any point of trouble.

Failing to find the trouble on the 66-kv. line made it necessary to turn for the time at least to the development of some means of suppressing the trouble on the distribution line in order to relieve radio reception conditions in the territory served by the distribution feeder and its branches. Numerous experiments were carried out with partial, but not sufficiently satisfactory results, including the scheme of creating an artificial neutral on the distribution line by means of three high resistances star connected with the neutral point grounded. The only thing left to try was the use of radio frequency choke coils and electrostatic condensers. However, none of this equipment was on hand.

Consequently the scheme hit upon was to install a 140-ft. section of three-conductor, lead-covered cable in place of one span of the 2.3-kv. overhead distribution line on one of the branch feeders where the interference condition was particularly intolerable. This section of underground cable was connected to the line at one pole-top and led down the pole and across to the next pole where it was carried aloft and connected to complete the branch feeder circuit. The cable furnished both series inductance and shunt capacitance, the sheath being grounded by burying it in the earth between poles.

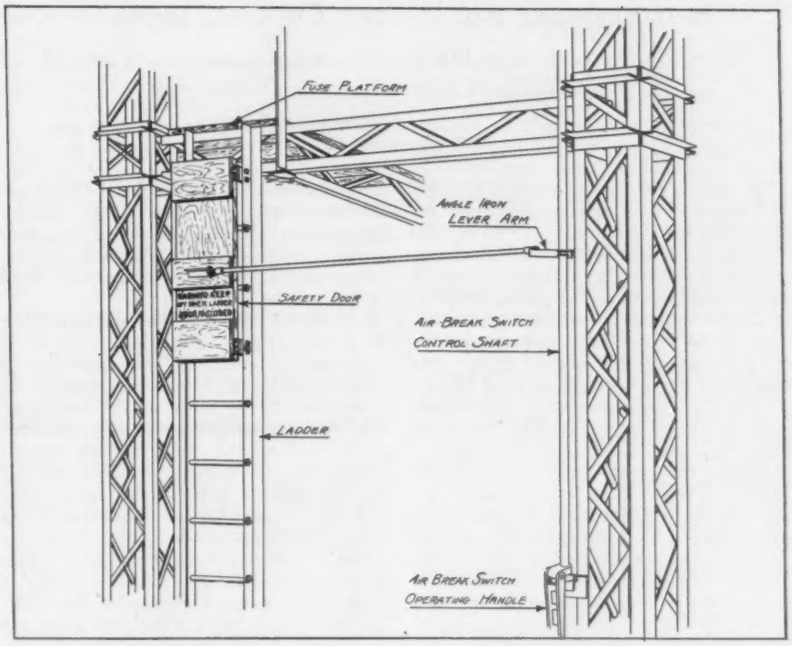
With this cable in section and service, and using the superheterodyne test equipment before mentioned set up two or three spans beyond the section of lead-covered cable, it was found that the noise level had been reduced from an off-scale reading to a reading of about 10. This noise-level reading was reduced further to a value of about 5 by the insertion of a radio frequency choke coil made up of 350 turns of wire wound on a 3-in. core in each leg of the three-phase branch line at the point of connection of the underground cable.

This method is expensive at best and should be recommended only for an emergency condition. However, the installation mentioned has been in satisfactory service for many months.

Automatic Safety Doors for Substation Ladders

Ladders are an invitation to climb. As an assurance that substation ladders will be climbed only under safe circumstances the engineering department of The Southern Sierras Power Company, Riverside, Calif., has devised a safety gate for ladders. Details are shown in the accompanying illustrations.

In the particular instance shown, the ladder leads from the ground up to the high-tension fuse platform of a steel substation structure and it was desired that the platform be accessible only when the main-line switch was opened. The ladder door is directly connected to the operating shaft by means of which the high-tension air-break switches at the top of the structure are operated from ground level. Thus, when the air-break switches are opened the ladder door automatically is swung to an open position permitting the ladder to be climbed.



Details of a ladder safety door for substation structures.

The arrangement is of obviously simple design and its construction and installation are inexpensive. It is considered to be a safety device well worth attention. Presence of the door on the ladder is a constant reminder against incautious ascent while the mechanical connection to the switch operating shaft through which the door is opened when the switch is opened is at once a matter of convenience as well as an added safety factor of much greater effectiveness than would be a padlock on the ladder door itself.

Rubber Stamps Show Tests of Rubber Gloves

Two rubber stamps that are used to advantage by the test and inspection department of the Pacific Gas and Electric Company, San Francisco, to mark the results of tests on rubber gloves and other protective equipment, are reproduced herewith. Fig. 1 shows the rubber stamp used in marking the boxes of new gloves that have been rejected and which are being returned to the manufacturer. To avoid damage to the glove itself the imprint is made on the box rather than on the glove. The use of the stamp in conjunction with the glove outline that it contains greatly simplifies the task of recording on each individual pair of gloves the exact point or points at which failure has occurred under test. This is accomplished merely by making a check mark in one or more of the six spaces provided and by placing a small cross mark in the proper relative position on the glove outline itself.

In Fig. 2 is reproduced a rubber stamp that is used in marking shipping notices, job orders, or work orders accompanying old gloves that are sent in by the various divisions or crews for the regular periodic check and test. This stamp also expedites and simplifies the accurate recording of the results of tests. In this particular case defective gloves and defective equipment are not returned to the division or to the crew from which they came but are retained at the central warehouse and subsequently disposed of as junk.

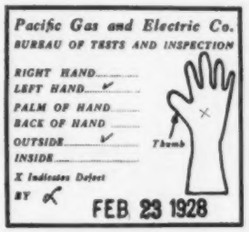


Fig. 1

RUBBER GOODS	RECEIVED	DEFECTIVE-REJECTED		O. K.
		MECHANICAL	PUNCTURED	
RIGHT GLOVES	50	1	2	47
LEFT GLOVES	50	0	1	49
SHIELDS				
HOSE				
BLANKETS				
			FEB 23 1928	

Fig. 2

Facsimile of rubber stamps used to mark defective rubber safety equipment.

Self-Starting Equipment for Oscillograph

Shop-Made Automatic Device Gives Instantaneous Control Necessary to Catch Flashover Transients

By J. H. VIVIAN[1] and L. L. CONRAD[2], Test Department, Southern California Edison Company, Alhambra, California.

DURING the early winter of 1926 numerous flashovers occurred on the 220-kv. Big Creek lines of the Southern California Edison Company, causing faulty relay operations of a varied nature, in some cases without apparent reason. Thus the protection engineering department had great difficulty in specifying proper relay settings and an investigation was inaugurated to determine the magnitude of ground currents during flashover periods.

As the causes of flashovers and the instant of occurrence were of an indeterminate character and impossible to anticipate, it was necessary to provide some device which would record the values of ground current and in which part of the secondary network they existed. So by necessity, some photographic device appeared to be the only type of apparatus which would meet the requirements, and the oscillograph was accepted as being the most generally applicable to the problem. Special apparatus is available on the market for this kind of service, but to expedite the investigation it was decided to utilize some equipment already on hand and immediately available. A Westinghouse standard three-element oscillograph was selected because of its portability, compactness, simplified illuminating system and its permanent field arrangement.

A study of the field conditions during flashover periods revealed that the time duration of transients was from one to four seconds. This required some consideration to be given to the length of film necessary to provide sufficient length of record per cycle to accommodate analytical purposes. A special film magazine was made which permitted the use of an endless film driven by a motor mechanism. This long film when cut and printed gave an oscillogram more than 40 in. long. The design of the magazine included two 8-in. drums spaced 10 in. apart and enclosed in a light-tight metal container. An adjustable idler was used to compensate for the slight differences in the length of film and to provide the proper tension to prevent slippage. A light-tight aperture and safety shutter similar to that on the standard film magazine was used, permitting use of the magazine on either a Westinghouse or General Electric standard oscillograph.

During the laboratory experimental work considerable difficulty was experienced in devising a suitable means of fastening the film to an endless belt, due principally to the fact that the structure of ordinary kodak film stock is of quite a different nature from motion picture film stock. This difference was noted immediately when an attempt was made to splice the kodak film with ordinary film cement in the same manner as is used very satisfactorily in the splicing of motion picture films. Various film cements were tried with the same general poor results. The end of the film from which the emulsion was removed soon softened under the action of some constituent of the film cement which reduced it to a gelatinous condition of very little strength, allowing the film to separate at such points under very little tension. This difficulty was remedied by the reinforcement of the splice with adhesive tape or gummed paper attached to the hard side of the film. This in no way interfered with the photographic record because the emulsion side of the film always was on the outside of the film belt running close to the magazine aperture.

In future investigations where continuous film operation is necessary it is planned to construct a large drum to which the film can be permanently attached by means of small clamps around the edges of the drum face. This procedure will remove some of the difficulties encountered in running a long film continuously for several days.

In the two-drum magazine it was

[1] Supervisor Relay Testing.
[2] Supervisor Standardizing Laboratory.

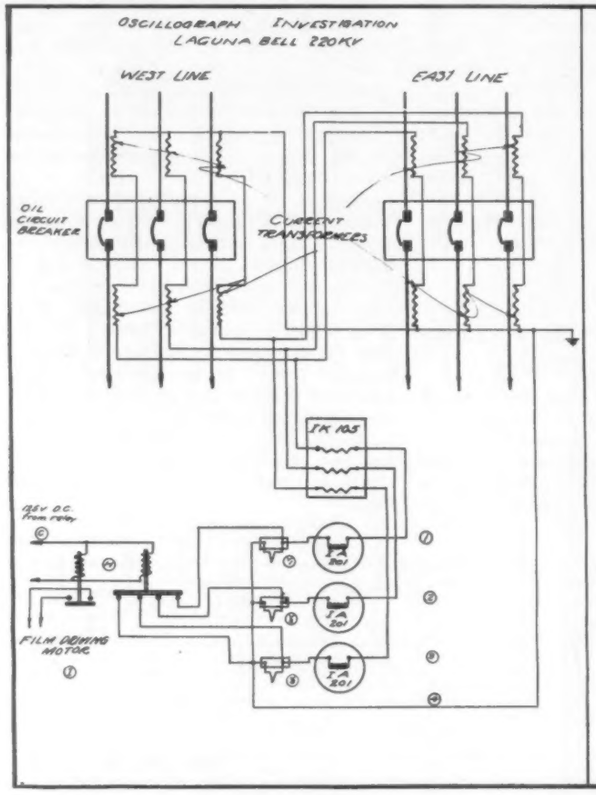


Fig. 1. Schematic diagram of differentially connected line current transformer secondary circuits utilized in flashover investigation on 220-kv. lines.

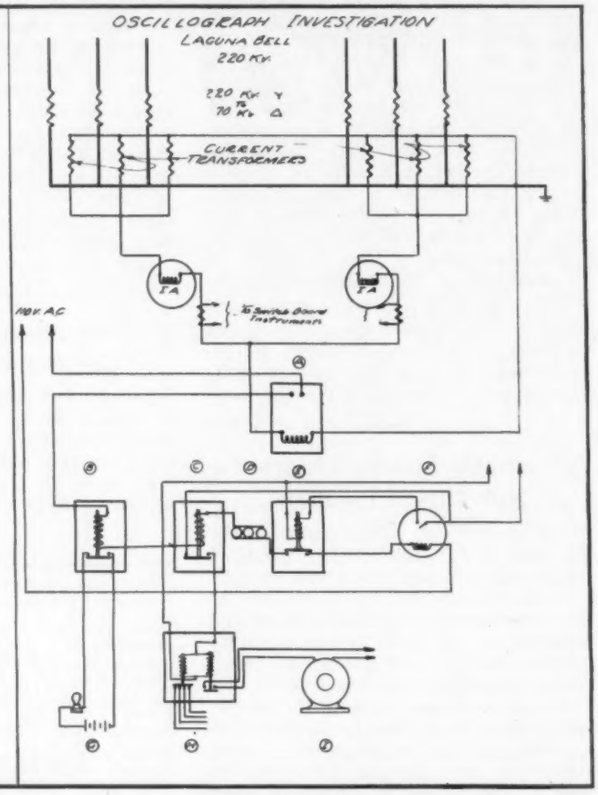


Fig. 2. Schematic diagram of initiating and control devices operating in the secondary leads of ground current transformers, as used in flashover investigation.

found inadvisable to allow the film to run for a period of more than 24 hours continuously at a film speed of one foot per second. Because of the importance of an early installation it was impossible to manufacture the magazine as a precision device and consequently small inaccuracies in the alignment of the two drums gave the film a tendency to weave laterally on the drums during its travel, similar to a leather belt seeking the highest pulley surface. During a period of from 18 to 20 hours of operation this weaving caused a slight roughening of the film edges which naturally resulted either in the rough edges catching at the aperture or the film mounting the turned edges of the drums, in either case stopping the film.

The field installation was made at Laguna Bell, the southern end of the 220-kv. Big Creek transmission line. In Fig. 1 is shown schematically the application in the secondary circuits of the differential connected current transformers on the line oil circuit breakers. V_1, V_2 and V_3 represent the oscillograph vibrator elements in series with the current elements of the IK105 and IA201 relays installed on lines Nos. 1, 2 and 3. Figure 2 shows schematically the initiating and control devices in the secondaries of the ground current transformers which are installed on the high-potential side of the 220/70-kv. star-delta transformers.

Relay A represents a low-energy CO relay which, with a close adjustment of contacts, operates on a small ground current. The contacts of relay A energize a circuit through the operating coils of relays B and C, a lamp load D, and relays E and F. Operation of B energizes the oscillograph lamp G which allows a beam of light to be reflected from the vibrator mirrors onto the sensitized film.

The operation of B and C are simultaneous. C in turn operates relay H which, as shown, energizes the film driving motor I, at the same time removing a short-circuiting device from the oscillograph leads and permitting the transient current to flow through the vibrators, thereby exposing the moving film.

E is a non-automatic manual reset disconnecting relay, operated by the closure of the contacts on a CO relay, F, which is given a time period adjustment of four seconds. The operation of relay E opens the current control circuits which de-energize relay B, extinguishing the light G, and opens the contacts of relay C which de-energizes the operating coil of H which replaces the short-circuit device on the vibrator circuit and stops the motor I.

Relay E being normally closed and manually reset prevents any re-operations which might destroy the record of a previous operation if such re-operations should occur after one exposure and prior to the exchange of the film holders. The short-circuiting device at H protects the vibrators from any damage which might result from excessive current under switching surges or other causes at times when there is no transient current in the vibrator circuits. Shunts permitting 50 amp. to flow in lines 1, 2 and 3 were put across the elements to protect the vibrators from excessive current.

Many oscillograms made with this equipment show that satisfactory flash-over records can be obtained as described, the apparatus operating automatically and in each case showing clearly that the incoming transient started the motor and lamp prior to the heavy current surge.

NEW BOOKS
for the Engineer

SCIENTIFIC PURCHASING, by Edward T. Gushee, purchasing agent, Detroit Edison Company, and L. F. Boffey, editor of *The Purchasing Agent*. First edition, 1928; 6 x 9 in.; cloth; 196 pages; 25 illustration. Price $3.—Published by McGraw-Hill Book Company, New York; for sale by Technical Book Shop, 883 Mission St., San Francisco. The authors of this work do not presume to class purchasing with the true sciences, but class modern purchasing as scientific under the definition, "Science: any branch or department of systematized knowledge considered as a distinct field of investigation or object of study." The routine of purchasing is not given in detail, but a sound foundation for a successful purchasing routine is given. The work is a textbook of fair dealing between buyer and seller and as such should be of interest not alone to expert purchasing agents, but also to others who are trying to broaden their understanding.

FUNDAMENTAL PRINCIPLES OF ELECTRIC AND MAGNETIC CICUITS, by F. A. Fish, M.S. in E.E., Fellow A.I.E.E.; head of E.E. department, Iowa State College. Second edition, 1928; 212 pages; 124 illustrations; 6 x 9 in.; cloth. Price $3.—Published by McGraw-Hill Book Company, New York; for sale by Technical Book Shop, 883 Mission St., San Francisco. The author needs no introduction for the first edition of his book, issued in 1920, has found ready acceptance as a teachable text. The general treatment of this second edition is the same as in the first edition, but advantage has been taken to expand certain topics and to make appreciable addition to the discussion on the use of complex quantities. The subject matter is handled as an introduction to the study of electric power machinery and transmission, embracing what the author believes to be the vital fundamental principles. It is designed for undergraduate study.

RADIO—A STUDY OF FIRST PRINCIPLES, by E. E. Burns, instructor in Physics, Austin High School, Chicago. 255 pages; 211 illustrations; 5½ x 8 in.; cloth. Published by D. Van Nostrand Company, 8 Warren St., New York. Price $2.—This is an elementary text written primarily for use in high schools, evening classes, and for home study. The treatment is practical rather than theoretical and is not mathematical in character. The main effort of the author is to present simply and clearly the fundamental principles of electricity as applied to radio. The author has used the text for some years in instructing boys of 16 to 18 years of age.

CODE FOR ELECTRICITY METERS—third edition. Published by the National Electric Light Association, 420 Lexington Ave., New York. 122 pages; 6 x 9 in.; fabrikoid. Price $2.—This third edition of the code was prepared by a special committee under the joint sponsorship of the Association of Edison Illuminating Companies, the N.E.L.A. and the U.S. Bureau of Standards. It is approved as "American Standard" by the American Engineering Standards Committee. This edition is the result of a complete general revision of the code as previously published and is fully up to date.

TRANSFORMER CONSTRUCTION AND OPERATION, by Emerson G. Reed Transformer Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. First edition. 5 x 7 in.; cloth; 227 pages; 129 illustrations. Published 1928 by McGraw-Hill Book Company, New York; for sale by Technical Book Shop, 883 Mission St., San Francisco. Price $3.—This book aims to present a comprehensive outline of modern transformer practice treating design problems only incidentally and avoiding the use of mathematics. It begins with a short review of the main stages of development of the transformer, subsequently discussing in detail transformer construction and operation. It should be of interest to electrical engineers in general and particularly to practical electrical workers. The text has grown out of material used for a course of instruction by the educational department of the East Pittsburgh Works.

INDUSTRIAL MANAGEMENT, by Richard H. Lansburgh, professor of industry, University of Pennsylvania. Second edition, revised; 6 x 9 in.; cloth; 509 pages; 150 illustrations. Published 1928 by John Wiley & Sons, Inc., New York. Price $4.50.—The author has prepared this book with the confident and logical opinion that upon an understanding and careful analysis of management problems and intelligence in their handling depends industrial success. In the text stress is placed upon organizatoin problems in support of the author's convictions that if a satisfactory organization structure be developed for any enterprise, all other phases of management automatically are simplified. Plant and working conditions, standardization, job study, wages, personnel relations, and controlling operations such as budgeting, sales control, purchasing and storeroom operations, etc., are treated in logical order.

N.E.M.A. HANDBOOK OF APPARATUS STANDARDS, seventeenth edition, published May, 1928, by the National Electrical Manufacturers' Association, 420 Lexington Ave., New York. 6 x 9 in.; paper bound; 348 pages; illustrated. Price $3.—This publication formerly was known as the Electric Power Club Handbook of Electrical Apparatus and contains test, manufacturing and performance standards of electrical apparatus. The book embraces standards of electric power, control and measuring equipment for the generation, distribution and utilization of electric energy. Each section of the handbook covers related equipment and is complete in itself, all of the rules relating to each product being grouped together.

THE LINEMAN'S HANDBOOK, by Edwin Kurtz, M.S., E.E., professor of E.E., Oklahoma Agricultural and Mechanical College. First edition, 1928; 5 x 7¾ in.; fabrikoid; 547 pages; 602 illustrations. Price $4.—Published by McGraw-Hill Book Company, New York; for sale by Technical Book Shop, 883 Mission St., San Francisco. This book is written expressly for linemen, line foremen and others in line departments. It is designed as a home-study book and a handy ready-reference book combined and covers construction and maintenance methods and procedure. The language and treatment of the text is simple and many illustrations further facilitate a ready understanding. It should be of service to any lineman or other person interested in the construction and maintenance side of line work.

STORAGE BATTERIES, by Morton Arendt, E.E., assistant professor of electrical engineering, Columbia University, Fellow A.I.E.E. Published by D. Van Nostrand Company, Inc., 8 Warren St., New York. First edition, 1928; cloth; 6 x 9 in.; 285 pages; 156 illustrations. Price $4.50.—The author prepared the manuscript from which this book was published originally as a series of lectures given to engineering students and to officers of the U.S. Submarine School. The author has had sufficient practical experience in battery manufacture and maintenance to enable him to write authoritatively and in such a manner that his work should be of service to those interested in the construction and maintenance of storage batteries. Only such simple theory as is necessary to account for the chemical reactions and normal characteristics of storage batteries has been included in the text. The book should serve as a text or reference.

Ideas for the Contractor

There Is Profit in the Well Run Repair Business

Experience of Several Contractors Who Specialize in it Proves That a Nuisance Can Be Turned Into a Paying Proposition

ONE DAY Paul Needham, Electragist of Beverly Hills, Calif., sent out one of his men on a repair job. There were two streets of the same name, each in a different municipality, and the repair man went to the number given but on the wrong street. When he returned to the shop that evening he was asked why he had not taken care of the trouble call. He replied that he had and was going to be busy on the job for a couple of days.

It developed that when the repair man appeared at the other address he announced himself as the electrician come to make repairs and was immediately set to work by the woman who was under the impression that her husband had called in the electrician for work that had needed attention for some time.

"This incident convinced me," said Paul Needham, "that there is a good deal of electric repair business to be done almost everywhere in the residential sections of our cities. It only needs to be uncovered. I am going to figure out some method of uncovering this business."

The repair game, considered by many electrical contractors and dealers as more or less of a nuisance, has been found to be a profitable specialty by others. The Byington Electric Company of San Francisco, for instance, maintains a fleet of ten repair trucks on electric appliance repairs, wiring alterations, and radio repair alone.

Two other particular instances of successful repair businesses built up may be described more in detail. These are the specialized repair departments of C. A. Duncan, Spokane, and the Gross Electric Repair Shop of Portland.

In Spokane

Mr. Duncan, three years ago, departmentalized the various functions of the Duncan Electric Company of Spokane. In this departmentalization repairs proved an important feature. The department now employs five men and occupies one-half of the store space.

As with a number of shoe repair establishments, a long bench and instruments are maintained and the work is done in plain sight of the customer. It has been found that intricate jobs create interest and passersby are attracted to the workmen and thus reminded of their own repair jobs to be done.

Blotter reminder used by Gross of Portland to keep customers informed of his type of service.

Each of the men is a specialist. Two are employed making keys and doing small jobs of such nature; one works on motor appliances, one on heating devices, one on radio. The bench is divided with a section for each man. It is so arranged that one man waits on a customer, tests the apparatus and gives his opinion as to time and cost. If in doubt, he calls in the expert specializing in that type of appliance.

Each article is handled entirely by one workman. In order not to lose parts, screws, etc., for the job have individual numbered boxes. A separate partition is maintained for each article to be repaired.

Promptness is specialized in, an effort being made to finish with the article a little sooner than elsewhere. The entire business is carried on a cash basis with no collections or bad accounts. Deliveries are few and only on large appliances. Two deliveries are made daily. The delivery trucks are equipped to make home repairs such as keys, sockets, convenience outlets, etc. Drawers in the trucks are filled with supplies.

A large stock of repair parts is kept on hand and the returns on this have proved to be good. The department is always busy. A 100 per cent markup on time and material provides a fair margin of profit. The repair business being kept separate from other departments, is made to stand alone and pay its own way.

Advertising is used in newspapers, telephone books, as well as by means of post cards, personal cards and tags on all articles sold or repaired.

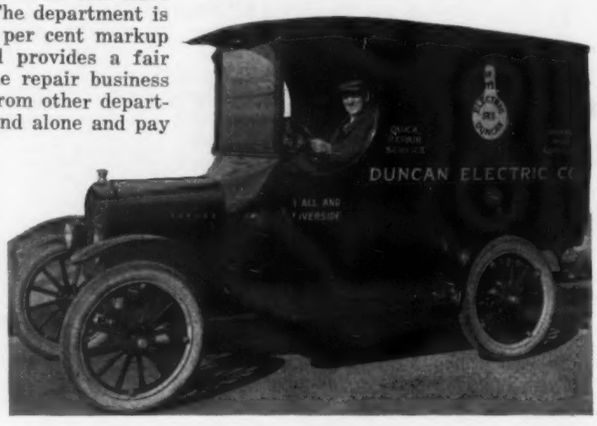
In Portland

The Gross Electric Repair Shop of Portland is a small shop with a storage space under the sidewalk, located on a busy corner. A repair bench is maintained in the window. The shop is located at the stage line terminal where people wait for stages, an advantageous location. A large collection of parts is maintained and where parts are unavailable, the shop undertakes to reconstruct or make them. A special feature of this shop is that appliances will be called for and delivered without charge.

Repairs in the home as well as small alterations are undertaken. Night calls are made as well as day calls. On phone calls a diagnosis of the trouble is attempted by questioning so that proper equipment may be taken along. The business in the past has kept four men busy.

Job slips for material and repair slips are used in keeping check of the business. Advertising is in the form of telephone book space, blotters and similar direct matter.

A few lamps and appliances are carried but this is entirely secondary to the repair business. Alterations, however, are quite a factor. An unusual feature of the proposition is that people from all over the surrounding country send in appliances to be repaired by parcel post or by the stage line.



C. A. Duncan of Spokane at the wheel of one of his specially equipped repair trucks which contain everything necessary for home repairs and alterations.

The "Certified Wiring" Approach to Red Seal Jobs

Appreciation of Certified Plumbing, Heating or Roofing by General Contractor Opens Door for Certification of Wiring Through Plan

SOMETHING about the word "certified" gives it entree with the builder where other means fail. That this is true is not surprising when it is recognized that the word "certified" has been established in the mind of the building contractor by the heating and plumbing, the roofers and other building trades.

Therefore, where approach on the basis of the Red Seal Plan has made no headway, it has been found in San Francisco that an approach from the angle of "certified wiring" immediately attracts attention.

This fact was first uncovered by J. A. McWilliams, field representative of the California Electrical Bureau, in contacting speculative builders of apartment house property. He found that with the owner of the home itself an appreciation of the Red Seal Plan was not hard to develop, but with builders this was not the case. He noticed, on the other hand, that builders accepted unquestioningly certified plumbing and certified heating or roofing. He decided to attack the problem from the angle of certified wiring.

Consequently, in making an approach for the Red Seal Plan, Mr. McWilliams drew the attention of the contractor to the fact that he understood and appreciated certified heating and plumbing and asked whether or not he had ever considered certification of the wiring of his apartment building. From this lead it was easy for him to demonstrate that by means of the Red Seal Plan it was possible for the first time to obtain certification of wiring. The details of the plan and its advantages then followed naturally.

To this method of procedure can be attributed not a little of the success of Red Seal work among builders of a large number of apartment buildings in San Francisco during the past year. The number of Red Seal all-electric apartments being constructed in this city has shown consistent increase as a result.

Electrical contractors who have tried this method of approach have also reported success in their Red Seal efforts where previous efforts with builders had failed.

Charles Shipman, of Shipman & Lauer, doing a large percentage of apartment house building, has found this approach particularly effective and is enthusiastic over the plan, whereas his previous experience in trying to sell the Red Seal idea to speculative builders had been discouraging.

Funeral Parlor Red Seal

Even funeral parlors qualify for the Red Seal these days. In Sacramento, Louis McGinnis, Electragist, recently completed an all-electric installation at the Cipa funeral parlor. Above the funeral parlors, which occupy the ground floor and basement, were built a number of apartments, each of which was fully electrically equipped.

Individual heating of parlors in the funeral establishment by means of electric heat was the feature upon which the installation was sold.

Red Seal Contractors

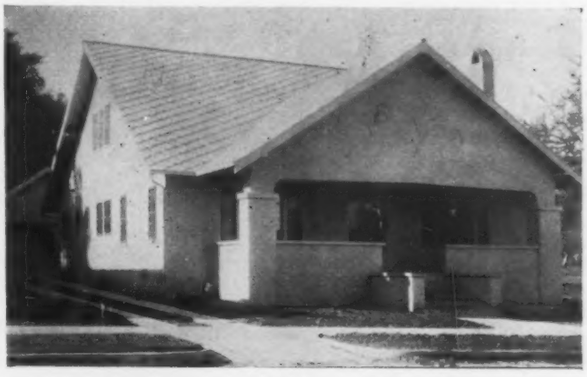
A card bearing the names of all contractor-dealer members of the Electrical League of Colorado recently has been issued by that organization. The list is printed also on the back of all the staff's business cards. When architects or builders have been given advisory service by the staff they are asked very often for suggestions as to what contractors are best qualified to make the installation. The names of the members on the reverse side of the business card give the architect a list of the most progressive contractors in the city of Denver.

THESE electrical contractors are assisting in the support of the League's advisory service. They are specialists in making RED SEAL wiring installations.

Bolibaugh Elec. Co.	South 9366-J
Byrne Electric Co.	York 1414
Denver Electrical Co.	Main 1986
Edwards Electric Co.	Main 4498
Fischer, J., Electric Co.	Main 2188
Graveline Electric Co.	South 8722
Guscott, Wm. A. J.	Main 1800
Headrick Electric Co.	South 1740
Kaffer-Chapman El. Co.	Main 2252
Lewis, James	Sunset 1443-J
Milzer Electric Co.	Main 1217
Queen City Elec. Co.	Main 7867
Reid, H. G.	Main 2303
Schockett Electric Co.	Main 8229
Scott Bros. Elec. Co.	Main 1548
Shannon, Chas. N. & Co.	Main 2691
Silver State Elec. Co.	Main 1598
Sturgeon Electric Co.	Champa 1830
West Denver Elec. Co.	South 310
West, George B.	South 2380
Williams & Rose El Co.	Main 1538

Paso Robles "Super-Red Seal" Home

RED SEAL is advancing rapidly in the San Luis Obispo district. One of the notable installations recently was that made by E. T. Jacobson, proprietor of the Valley Electric Company, San Luis Obispo, for O. E. Daugh at Paso Robles. The general wiring was considerably above Red Seal standards as to the number of convenience outlets, lighting outlets and switches. The contractor sold and installed a 7-kw. range, a 5-kw. water heater, a 1,500-watt air heater in each of the two bathrooms, and installed 220-volt outlets with sufficient capacity for 6-kw. heaters in all rooms in the house. Other equipment included kitchen ventilating fan and electric refrigerator. E. L. Fauset, general contractor of San Luis Obispo, was the builder.



Floodlighting of the building at the opening ceremonies.

Los Angeles City Hall Job

Excellent Co-ordination Between All

LOS ANGELES broke its own height limit to make its new city hall the one skyscraper which would tower above all else in its fast growing community. The result has been a distinctive and uniquely architectured building whose various features already have been described in publications devoted to architecture.

Electrically this city hall has many features which set it apart from the typical large office building of more or less standard practice.

The most noteworthy feature of the job, in its electrical aspects, was probably the close co-operation maintained between the architects, John C. Austin, John Parkinson and Albert C. Martin; the electrical and mechanical engineers, Holmes & Sanborn; the general contractor, C. J. Kuback Company; and the electrical contractor, the English Electric Company of Los Angeles. Co-ordination of effort resulted in the maintenance of a set schedule which made possible the finishing of the building within eighteen months of the time the work was started, Oct. 15, 1926,—less time than the limit allowed by the architect. This was done in spite of the contract requirement that no workman be allowed to work more than eight hours, an agreement which was strictly adhered to.

Working conditions on the building according to "Jim" English, electrical contractor, were ideal. Each day the superintendent for the general contractor gave a schedule to the sub-contractor's foreman, indicating where he would be pouring concrete or installing work the next day. In this way the various foremen knew what was to be expected and could place their men accordingly.

The sub-basement and basement were allotted to the various contractors for building their storerooms and offices. This part of the building had been finished first. As the building stands these floors are designed for the parking of cars, hence making an ideal place for the delivery by trucks of materials to the various contractors' storerooms, saving a large amount of time and handling costs and keeping the material away from the street.

On a job of this size each contractor is required to submit detailed drawings of the particular locations or conditions pertaining to his work. In this case all detailed drawings were given consideration at once. This was one of the principal factors which made it possible to keep the time schedule in effect.

The architect's superintendents had permanent offices on the job so that any question arising about the construction could be settled immediately by all contractors involved.

When the work started the electrical contractor installed a small Western Electric telephone system connecting the offices of the architect's superintendents, general contractor, electrical contractor, mechanical contractor and the upper floors. This system, while inexpensive as to cost, proved exceedingly valuable in the saving of time and, according to the electrical contractor, in patience.

Labor-saving machinery was also used to a large extent. Motor driven cutting saws and threading machines for the larger sizes of conduit and underfloor duct were employed. Measurements were taken on the ground and telephoned to the sub-basement where the conduit or underfloor duct was cut to length and sent up on hoists or elevators.

After the contracts had been awarded each contractor received a schedule from the architects stating the date each section of the building would be roughed in and the date of finishing. The schedule in turn was used by the contractors in ordering their materials and saved delay.

Three-conductor steel underfloor duct was pioneered in Los Angeles on this building. It was used on practically all floors,—one duct for lighting, one for private telephones and bells and one for public telephones. Installation methods were described in an article in Electrical West, April, 1927, p. 214.

The baseboards in all rooms are made to be removable. The underfloor duct is run continuously to the baseboards or conducted by means of conduit to the baseboards. This makes a flexible installation from which taps may be taken at will.

Service is furnished the building by the Bureau of Power and Light from two separate distribution points to obviate breakdown. The primary service to the transformer vault in the sub-basement is 6,600 volts, reduced to 220-volt, three-phase power, 110/220 volts for lights. Motor generator sets were installed for d.c. to supply elevators and other apparatus requiring this type of energy.

An example of the possibility for closer co-operation on all details of the switchboards and panels, telephone cabinets, etc., when manufactured locally, was given in this case. All such equipment was furnished locally by Brown & Pengilly, now known as the Diamond Electrical Manufacturing Company, Inc. A particular feature of

Rear of the main switchboard prior to installation. It was made up in sections at the factory, disassembled and delivered as required, set up, bolted and connected in record time. The board is one of the largest on the Pacific Coast.

Holds to Schedule

Crafts Simplifies Work

Junction box (open) on the three-channel steel underfloor duct at time of installation.

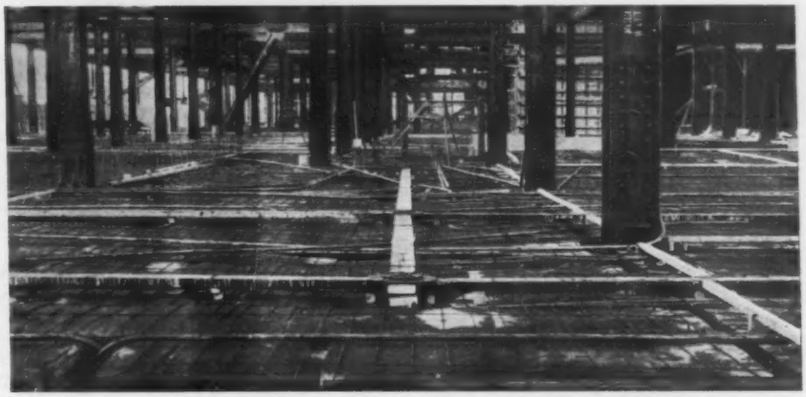
the panels was that all panel board cabinets were set flush and covered with iron doors, having no hinges or catches protruding from the face.

Erecting the switchboard was accomplished in a unique but effective way. The switchboard manufacturer delivered to the job an angle iron frame. The lower edge of this frame was set while the concrete was being poured. This left the upper edge projecting above the floor. The switchboard was delivered in sections, set up on this frame, bolted down and fastened together. The bus bars were connected and the board was installed. The electrical contractor's foreman declared that the board was placed and all bolted in place in 48 man-hours' time, not including the splicing of cables to lugs. All conduits were brought underground to the connecting gutter at the bottom rear of the board, no conduit entering the top of the board. Lead cable was used for all underground conduit.

The main switchboard is 8 ft. high and 44 ft. long, declared to be the largest board of its type on the coast. The power section has a capacity for 1,250 hp. Lighting sections of the main board have capacity for 9,000 amp. at 220 volts. In addition to the main board there are three other switchboards, one for boiler room, one for tower section and one on the seventeenth floor.

Other electrical systems include a 37-station fire alarm watchman system directly connected to the city fire alarm system; an intercommunicating and outside telephone system and provisions for future installation of a dictagraph system.

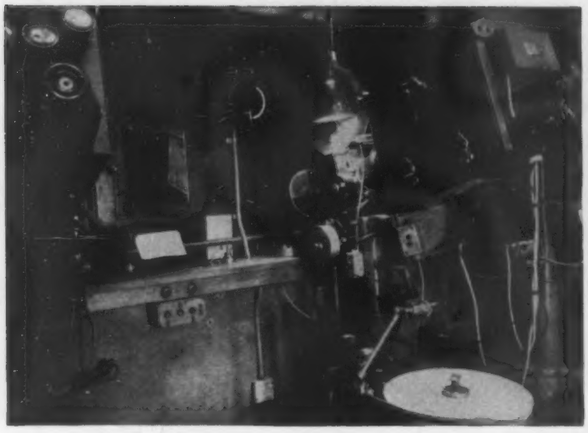
Located prominently on a hill between Spring and Main Sts., and towering 28 stories on the Spring St. side and 32 stories on the Main St. side, the Los Angeles City Hall can be seen from practically all sections of the city. At night an 8,000,000-cp. air beacon on the tower can be seen 30 miles.

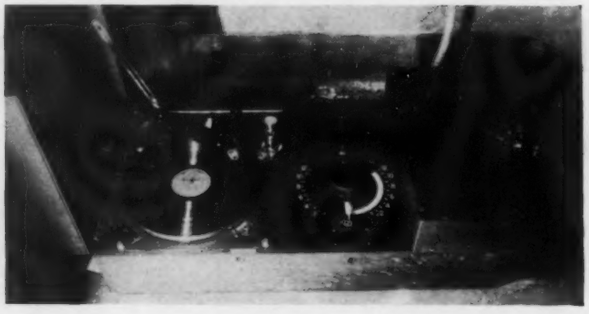


Runs of underflood duct and conduit at roughing-in stage, before the concrete pour.

Schools Shown Value of Adequate Transformer Vault Space

FRESNO schools have been sold the value of adequate transformer vault and switchboard space by Carl V. Wolf of the Valley Electrical Supply Company. Above are photographs taken in one of the typical new schools under the standards recently established. (See Electrical West, April 1, 1928, p. 199.) At the left is the main switchboard under installation, its back against the wall of the transformer vault. The switchboard is entirely self-contained. It receives service through the rear by means of an aperture cut in the tile wall. Connections are made through this port to the current coils and main transformers, shown in the right-hand picture. Copper bonding strips are used to ground all apparatus. Feeders to the various buildings are brought in to a pull box located in the basement area way wall from which they are drawn into the bottom of the switchboard as shown.





Left, projection machine equipped for Vitaphone. Note the "fader" on the front wall, by means of which the tone is regulated and changes from one projector to another effected. *Above*, a non-synchronous pick-up from phonograph records.

Late "Talkie" Installations in San Francisco Theaters

Growth of Popularity of Synchronized Pictures Requires Equipment Changes in Many Long Established Houses.

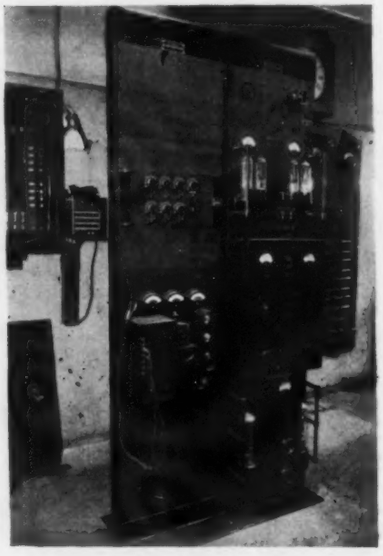
TALKING moving picture installations have set the movie world agog. Practically every large theater in every large city is equipping with the synchronizing apparatus necessary for this type of production. In a previous issue of Electrical West (August, 1927, p. 92) a Los Angeles installation was described in detail.

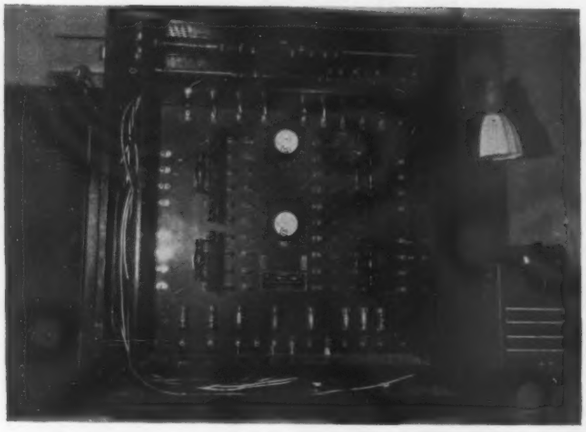
On this page are photographs of San Francisco installations made by The Sterling Electric Company, of which Edward Martin, vice-president of the California Electragists, is proprietor.

On the left may be seen the method employed to install the reproducing horns in the angle-iron framework. These frames can be moved close against the back of a screen which, though reflecting all light thrown upon it, is transparent to sound.

At the right is a large control panel of the most up-to-date type.

Below, left, is a close-up of the latest type of resistor panel. Lower right shows the battery bank necessary for the operation of the system.





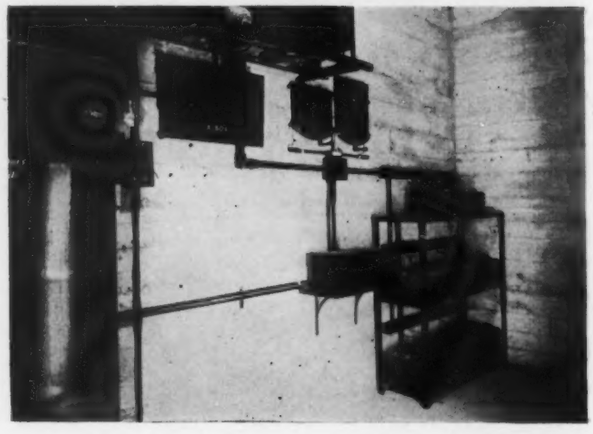


Table A—Duct Equivalents

CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION

Short Side Rect.	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
6	6.9	7.6	8.2	8.8																														
7	7.3	8.0	8.7	9.3	9.9																													
8	7.7	8.4	9.2	9.8	10.4	11.0																												
9	8.0	8.7	9.5	10.2	10.8	11.5	12.1																											
10	8.3	9.2	9.8	10.6	11.2	11.9	12.5	13.2																										
11	8.7	9.6	10.4	11.1	11.8	12.5	13.1	13.7	14.3																									
12	8.9	9.9	10.8	11.5	12.3	13.0	13.7	14.3	14.9	15.4																								
13	9.2	10.2	11.1	11.9	12.7	13.4	14.1	14.7	15.3	15.9	16.5																							
14	9.5	10.5	11.4	12.3	13.1	13.8	14.5	15.2	15.8	16.4	17.0	17.6																						
15	9.8	10.8	11.8	12.6	13.4	14.2	14.9	15.6	16.3	16.9	17.5	18.1	18.7																					
16	10.0	11.1	12.1	12.9	13.8	14.5	15.3	16.0	16.7	17.3	18.0	18.6	19.2	19.8																				
17	10.3	11.4	12.4	13.3	14.1	14.9	15.7	16.4	17.1	17.8	18.4	19.1	19.7	20.3	20.9																			
18	10.5	11.7	12.7	13.6	14.5	15.3	16.1	16.8	17.5	18.2	18.9	19.6	20.2	20.8	21.4	22.0																		
19	10.8	11.9	13.0	13.9	14.8	15.6	16.4	17.2	17.9	18.6	19.3	20.0	20.7	21.3	21.9	22.5	23.1																	
20	11.0	12.2	13.3	14.2	15.1	16.0	16.8	17.6	18.3	19.0	19.7	20.4	21.1	21.7	22.3	23.0	23.6	24.2																
21	11.3	12.4	13.5	14.5	15.4	16.3	17.2	18.0	18.7	19.4	20.1	20.8	21.5	22.2	22.8	23.4	24.0	24.6	25.2															
22	11.5	12.7	13.8	14.8	15.7	16.7	17.6	18.4	19.2	19.9	20.6	21.3	22.0	22.7	23.3	23.9	24.5	25.1	25.7	26.4														
23	11.8	13.0	14.1	15.1	16.1	17.0	17.9	18.8	19.6	20.3	21.1	21.8	22.5	23.2	23.8	24.4	25.1	25.7	26.3	26.9	27.5													
24	12.1	13.3	14.4	15.4	16.4	17.4	18.3	19.2	20.0	20.8	21.5	22.3	23.0	23.7	24.3	25.0	25.6	26.2	26.8	27.4	28.0	28.6												
25	12.4	13.6	14.7	15.7	16.7	17.7	18.6	19.5	20.4	21.2	22.0	22.7	23.4	24.2	24.8	25.5	26.1	26.7	27.3	27.9	28.5	29.1	29.7											
26	12.6	13.9	15.0	16.1	17.1	18.1	19.0	19.9	20.8	21.6	22.4	23.2	23.9	24.6	25.3	26.0	26.6	27.3	27.9	28.5	29.1	29.7	30.3	30.9										
27	12.9	14.2	15.3	16.4	17.4	18.4	19.4	20.3	21.2	22.0	22.8	23.6	24.4	25.1	25.8	26.5	27.2	27.8	28.4	29.1	29.7	30.3	30.9	31.5	32.1									
28	13.2	14.5	15.6	16.7	17.8	18.8	19.7	20.7	21.6	22.4	23.3	24.1	24.8	25.6	26.3	27.0	27.7	28.4	29.0	29.6	30.3	30.9	31.5	32.1	32.7	33.3								
30	13.7	15.0	16.2	17.3	18.4	19.4	20.4	21.4	22.3	23.2	24.1	24.9	25.7	26.5	27.3	28.0	28.7	29.4	30.1	30.8	31.4	32.1	32.7	33.3	33.9	34.5	35.1	35.7						
32	14.2	15.5	16.7	17.9	19.0	20.0	21.1	22.1	23.0	24.0	24.9	25.8	26.6	27.4	28.2	29.0	29.7	30.4	31.1	31.8	32.5	33.2	33.8	34.4	35.1	35.7	36.3	36.9	37.5	38.1				
34	14.6	16.0	17.2	18.4	19.5	20.6	21.7	22.7	23.7	24.6	25.6	26.5	27.3	28.2	29.0	29.8	30.6	31.3	32.0	32.7	33.4	34.1	34.8	35.4	36.1	36.7	37.3	37.9	38.5	39.1	39.7	40.3		
36	15.1	16.5	17.7	18.9	20.1	21.2	22.3	23.3	24.3	25.3	26.3	27.2	28.1	29.0	29.8	30.6	31.4	32.2	32.9	33.6	34.3	35.0	35.7	36.4	37.0	37.7	38.3	38.9	39.5	40.1	40.7	41.3	41.9	42.5
38	15.5	16.9	18.2	19.4	20.6	21.7	22.9	23.9	24.9	25.9	26.9	27.9	28.8	29.7	30.6	31.4	32.2	33.0	33.8	34.5	35.2	35.9	36.6	37.3	38.0	38.6	39.3	39.9	40.5	41.1	41.7	42.3	42.9	43.5
40	15.9	17.4	18.7	19.9	21.1	22.3	23.4	24.5	25.5	26.5	27.5	28.5	29.4	30.3	31.2	32.1	32.9	33.7	34.5	35.3	36.0	36.7	37.4	38.1	38.8	39.5	40.1	40.8	41.4	42.0	42.6	43.2	43.8	44.4
42	16.4	17.8	19.2	20.4	21.6	22.8	24.0	25.1	26.1	27.1	28.1	29.1	30.0	31.0	31.9	32.7	33.6	34.4	35.2	36.0	36.8	37.5	38.2	38.9	39.6	40.3	41.0	41.6	42.3	42.9	43.5	44.1	44.7	45.3
44	16.8	18.3	19.7	21.0	22.2	23.4	24.6	25.7	26.8	27.8	28.8	29.8	30.8	31.7	32.6	33.5	34.4	35.2	36.0	36.8	37.6	38.4	39.1	39.8	40.5	41.2	41.9	42.6	43.2	43.9	44.5	45.1	45.7	46.3
46	17.2	18.7	20.2	21.5	22.8	24.0	25.2	26.4	27.5	28.5	29.6	30.6	31.6	32.5	33.4	34.3	35.2	36.1	36.9	37.7	38.5	39.3	40.0	40.8	41.5	42.2	42.9	43.6	44.3	44.9	45.6	46.2	46.8	47.4
48	17.6	19.2	20.7	22.1	23.4	24.6	25.9	27.1	28.2	29.3	30.4	31.4	32.4	33.4	34.3	35.2	36.1	37.0	37.8	38.7	39.5	40.3	41.0	41.8	42.5	43.2	43.9	44.6	45.3	46.0	46.6	47.2	47.8	48.4
50	18.0	19.6	21.1	22.6	23.9	25.2	26.5	27.7	28.9	30.0	31.1	32.2	33.2	34.2	35.1	36.1	37.0	37.9	38.8	39.6	40.4	41.2	42.0	42.8	43.5	44.2	44.9	45.6	46.3	47.0	47.6	48.3	48.9	49.5
52	18.4	20.0	21.5	23.0	24.4	25.7	27.0	28.3	29.5	30.6	31.8	32.9	33.9	35.0	36.0	36.9	37.9	38.8	39.7	40.5	41.4	42.2	43.0	43.8	44.6	45.3	46.0	46.7	47.4	48.1	48.8	49.4	50.1	50.7
54	18.8	20.4	22.0	23.5	24.9	26.3	27.6	28.9	30.1	31.3	32.5	33.6	34.7	35.8	36.8	37.8	38.8	39.7	40.6	41.5	42.4	43.2	44.0	44.8	45.6	46.4	47.1	47.8	48.5	49.2	49.9	50.6	51.2	51.9
56	19.2	20.8	22.4	23.9	25.4	26.8	28.2	29.5	30.7	32.0	33.2	34.3	35.4	36.5	37.6	38.6	39.6	40.6	41.5	42.4	43.3	44.2	45.0	45.8	46.6	47.4	48.2	48.9	49.6	50.3	51.0	51.7	52.4	53.0
58	19.6	21.2	22.8	24.4	25.9	27.3	28.7	30.1	31.4	32.6	33.9	35.1	36.2	37.3	38.4	39.4	40.5	41.5	42.4	43.4	44.3	45.2	46.0	46.9	47.7	48.5	49.3	50.0	50.8	51.5	52.2	52.9	53.6	54.3
60	20.0	21.6	23.2	24.8	26.3	27.8	29.2	30.6	31.9	33.2	34.5	35.7	36.9	38.0	39.1	40.2	41.2	42.2	43.2	44.2	45.1	46.0	46.9	47.8	48.6	49.5	50.3	51.1	51.8	52.6	53.3	54.0	54.7	55.4
62	20.4	22.0	23.6	25.2	26.7	28.2	29.7	31.1	32.4	33.8	35.1	36.3	37.5	38.7	39.8	40.9	42.0	43.0	44.0	45.0	46.0	46.9	47.8	48.7	49.6	50.4	51.3	52.1	52.9	53.6	54.4	55.1	55.8	56.5
64	20.8	22.4	24.0	25.6	27.1	28.6	30.1	31.5	32.9	34.3	35.6	36.8	38.1	39.3	40.4	41.5	42.6	43.7	44.7	45.7	46.7	47.6	48.6	49.5	50.4	51.3	52.1	52.9	53.7	54.5	55.3	56.0	56.7	57.4
66	21.1	22.8	24.4	26.0	27.5	29.0	30.5	32.0	33.4	34.7	36.1	37.3	38.6	39.8	41.0	42.1	43.2	44.3	45.3	46.3	47.3	48.3	49.2	50.2	51.1	52.0	52.8	53.7	54.5	55.3	56.1	56.8	57.6	58.3
68	21.5	23.2	24.8	26.4	28.0	29.5	31.0	32.4	33.9	35.2	36.6	37.9	39.1	40.4	41.5	42.7	43.8	44.9	46.0	47.0	48.0	49.0	49.9	50.9	51.8	52.7	53.6	54.4	55.3	56.1	56.9	57.7	58.4	59.2
70	21.9	23.6	25.2	26.8	28.4	29.9	31.4	32.9	34.3	35.7	37.1	38.4	39.6	40.9	42.1	43.2	44.4	45.5	46.6	47.6	48.6	49.6	50.6	51.6	52.5	53.4	54.3	55.2	56.0	56.9	57.7	58.5	59.3	60.0
72	22.3	24.0	25.6	27.2	28.8	30.3	31.8	33.3	34.8	36.2	37.5	38.9	40.2	41.4	42.6	43.8	45.0	46.1	47.2	48.2	49.3	50.3	51.3	52.2	53.2	54.1	55.0	55.9	56.8	57.6	58.5	59.3	60.1	60.9
74	22.6	24.4	26.0	27.6	29.2	30.8	32.3	33.8	35.2	36.7	38.0	39.4	40.7	42.0	43.2	44.4	45.6	46.7	47.8	48.9	49.9	51.0	52.0	53.0	53.9	54.9	55.8	56.7	57.6	58.4	59.3	60.1	60.9	61.7
76	23.0	24.8	26.4	28.0	29.6	31.2	32.7	34.2	35.7	37.1	38.5	39.9	41.2	42.5	43.7	45.0	46.2	47.3	48.4	49.5	50.6	51.6	52.7	53.7	54.6	55.6	56.5	57.4	58.3	59.2	60.1	60.9	61.7	62.5

Table C

PROPERTIES OF DRY AIR BAR. PRESS. 29.92 INS.

TEMP. DEG. FAHR.	WEIGHT PER CU.FT. IN LBS.	PERCENT OF VOL. AT 70° FAHR.	B.T.U. ABSORBED BY 1-CU.FT. AIR PER DEG. FAHR.	CU. FT. AIR HEATED 1-DEG. PER B.T.U.	TEMP. DEG. FAHR.	WEIGHT PER CU.FT. IN LBS.	PERCENT OF VOL. AT 70° FAHR.	B.T.U. ABSORBED BY 1-CU.FT. AIR PER DEG. FAHR.	CU. FT. AIR HEATED 1-DEG. PER B.T.U.
0	.08636	.8680	.02080	48.08	130	.06732	1.1133	.01631	61.32
5	.08544	.8772	.02060	48.55	135	.06675	1.1230	.01618	61.81
10	.08453	.8867	.02039	49.05	140	.06620	1.1320	.01605	62.31
15	.08363	.8962	.02018	49.56	145	.06565	1.1417	.01592	62.82
20	.08276	.9057	.01998	50.06	150	.06510	1.1512	.01578	63.37
25	.08190	.9152	.01977	50.58	160	.06406	1.1700	.01554	64.35
30	.08107	.9246	.01957	51.10	170	.06304	1.1890	.01530	65.36
35	.08025	.9340	.01938	51.60	180	.06205	1.2080	.01506	66.40
40	.07945	.9434	.01919	52.11	190	.06110	1.2270	.01484	67.40
45	.07866	.9530	.01900	52.64	200	.06018	1.2456	.01462	68.41
50	.07788	.9624	.01881	53.17	220	.05840	1.2835	.01419	70.48
55	.07713	.9718	.01863	53.68	240	.05673	1.3212	.01380	72.46
60	.07640	.9811	.01845	54.18	260	.05516	1.3590	.01343	74.46
65	.07567	.9905	.01829	54.68	280	.05367	1.3967	.01308	76.46
70	.07495	1.0000	.01812	55.19	300	.05225	1.4345	.01274	78.50
75	.07424	1.0095	.01795	55.72	350	.04905	1.5288	.01197	83.55
80	.07356	1.0190	.01779	56.21	400	.04618	1.6230	.01130	88.50
85	.07289	1.0283	.01763	56.72	450	.04364	1.7177	.01070	93.46
90	.07222	1.0380	.01747	57.25	500	.04138	1.8113	.01018	98.24
95	.07157	1.0472	.01732	57.74	550	.03932	1.9060	.00967	103.42
100	.07093	1.0570	.01716	58.28	600	.03746	2.0010	.00923	108.35
105	.07030	1.0660	.01702	58.76	700	.03423	2.1900	.00847	118.07
110	.06968	1.0756	.01687	59.28	800	.03151	2.3788	.00782	127.88
115	.06908	1.0850	.01673	59.78	900	.02920	2.5670	.00728	137.37
120	.06848	1.0945	.01659	60.29	1000	.02728	2.7566	.00680	147.07
125	.06790	1.1040	.01645	60.79	1200	.02392	3.1335	.00603	165.83

Simple Means of Estimating Ventilation Duct Systems

Examples Worked Out to Show Method From Use of Number of Valuable Tables Reproduced Herewith

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Electrical Estimating Series—XL

As stated previously in this series of articles on ventilation, it is impracticable either to supply or exhaust air through a long duct or system of ducts by means of propeller fans. This is true because the long ducts with turns in them create a resistance or pressure against which a propeller fan cannot effectively deliver or exhaust air. Where duct systems of over 30 ft. are required it is much more satisfactory to use blowers. In calculating the size of duct required to deliver or exhaust a given amount of air a knowledge of terms and rules is necessary. These are given herewith.

Terminology

C.F.M. or cu.ft. per min.—The amount of air used or required is calculated in terms of cubic feet per minute (c.f.m.). This is sometimes referred to as a.p.m. (air per minute).

Volume—The amount of air used, more commonly expressed in terms of cu.ft. per min. as defined above.

Velocity—The rate at which air travels expressed in terms of feet per minute, sometimes given as f.p.m.

Static Pressure—Friction caused by passage of air through ducts, registers, dampers, pipe turns and over or against any other obstruction, creates a resistance or pressure which the fan must counteract in supplying or exhausting air. This is referred to as static pressure (s.p.) and is measused in terms of water gage (w.g.).

Tip Speed—The tip speed of a fan wheel is determined by multiplying the circumference of the wheel in feet by the revolutions per minute (r.p.m.).

Brake Horsepower—This represents the actual horsepower required to drive a fan. Where appearing in performance tables it is referred to as b.h.p. It should be understood clearly that the horsepower rating of the motor should *exceed* the actual b.h.p. requirement of the fan to take care of transmission loss.

Blowers and exhausters generally are installed in connection with a system of ducts. In sizing the ducts the volume of air in cu.ft. per min. divided by the velocity in ft. per min. gives the area of duct in sq.ft. This is covered by the formula:

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Table B

PRESSURE & VELOCITY TABLE
AIR TEMPERATURE 70°F. BAR. PRES. 29.92

PRESSURE		VELOCITY	SQ ROOT	PRESSURE		VELOCITY	SQ ROOT
IN'S.	OZ'S.	FT. PER MIN.	VEL. PRESS'RE	IN'S.	OZ'S.	FT. PER MIN.	VEL. PRESS'RE
.05	.0289	896	.223	3.75	2.1630	7756	1.936
.10	.0577	1266	.316	3.90	2.2500	7910	1975
.20	.1154	1791	.447	4.00	2.3070	8010	2000
.25	.1443	2003	.500	4.25	2.4510	8256	2062
.30	.1730	2193	.547	4.50	2.5950	8496	2121
.40	.2308	2533	.632	4.75	2.7385	8729	2179
.43	.2500	2637	.655	5.00	2.8840	8943	2236
.50	.2884	2832	.707	5.20	3.0000	9134	2280
.60	.3460	3102	.774	5.50	3.1720	9392	2345
.70	.4037	3351	.836	6.00	3.4600	9810	2449
.75	.4326	3468	.865	6.50	3.7490	10218	2550
.80	.4614	3582	.894	6.94	4.0000	10545	2634
.87	.5000	3729	.932	7.00	4.0370	10595	2646
.90	.5190	3800	.948	7.50	4.3260	10968	2739
1.00	.5768	4005	1.000	7.80	4.5000	11187	2793
1.23	.7209	4478	1.118	8.00	4.6140	11328	2828
1.30	.7500	4566	1.140	8.67	5.0000	11792	2944
1.50	.8650	4905	1.225	9.00	5.1900	12015	3000
1.73	1.0000	5273	1.315	9.54	5.5000	12367	3089
1.75	1.0092	5298	1.323	10.00	5.7680	12665	3162
2.00	1.1555	5664	1.414	10.40	6.0000	13915	3225
2.17	1.2500	5895	1.473	11.00	6.3440	13282	3317
2.25	1.2975	6007	1.500	11.27	6.5000	13445	3348
2.50	1.4418	6332	1.581	12.00	6.9210	13875	3464
2.60	1.5000	6457	1.612	12.14	7.0000	13950	3484
2.75	1.5860	6641	1.658	13.00	7.4970	14443	3606
3.00	1.7300	6937	1.732	13.87	8.0000	14913	3725
3.03	1.7500	6976	1.741	14.00	8.0740	14985	3742
3.25	1.8740	7220	1.803	15.00	8.6500	15510	3875
3.47	2.0000	7457	1.863	15.61	9.0000	15820	3952
3.50	2.0185	7492	1.871	16.00	9.2270	16020	4000

$$Q = A \times V.$$

Q = Cubic feet of air per minute.
A = Area of duct in square feet.
V = Velocity of air in feet per minute.

For ordinary run of work the velocity should not exceed 1,200 ft. per min.

Example

What size duct is required to handle 2,800 cu.ft. per min. (Q) at 1,000 ft. per min. (V)?

Writing the above formula another way, we have:

A = Area of duct in sq. ft.

$$= \frac{\text{Q (cu. ft. per min.)}}{\text{V (ft. per min.)}} \quad \text{or}$$

$$A = \frac{2{,}800}{1{,}000} = 2.8 \text{ sq. ft..}$$

Thus the area of duct (A) is 2.8 sq. ft. or 403 sq. in.

Referring to Table A, we find that a 22-in. round duct or a 20 x 20-in. square duct may be used. Should this size be unsuited, due to the structural conditions, we can use a 24 x 17-in. or 34 x 12-in. The shape of the duct may vary as desired if the necesasry area is maintained. It is not considered good practice, however, to have the duct more than three times as wide as it is deep, as such a condition would create too large a friction loss. Allowance must be made for all elbows used as they increase the friction loss. Add five diameters for each square elbow and eight diameters for each round elbow to the length of duct to which the elbow is connected.

Grilles and Registers

In sizing grilles and register faces the same formula is used as for ducts, except that a lower velocity is figured to avoid a hissing or whistling which results from a high velocity. The velocity through grilles or registers in supply ducts should be approximately 300 ft. per min. and 400 ft. per min. through grilles in exhaust ducts.

Example

What size grille or register should be used when 1,100 cu.ft. per min. is being supplied?

1,100 ÷ 300 = 3.66 sq.ft. area required, or a total area of 527 sq.in.

A 26 x 20-in. register having an area of 520 sq. in. will meet the requirements. Different proportions of length and width may be used, if the area requested is maintained.

For exhausting the same amount of air (1,100 cu.ft. per min.) the grille or register would be used as follows:

1,100 ÷ 400 = 2.75 sq.ft. area required or 396 sq.in.

A 20 x 20-in. register serves the purpose, or other size giving same required area may be used. If design of register offers excessive restrictions, add 25 per cent to 50 per cent to area of opening.

Table B gives useful data pertaining to Pressure and Velocity. Tables C,

Table D-a

PRESSURE REQUIRED IN INCHES OF W. G. TO OVERCOME FRICTION LOSS PRESSURE LOSS PER 100 FT. DUCT

DUCT DIAM. INCHES	VELOCITY IN FEET MINUTE.									
	100	200	300	400	500	600	700	800	900	1000
3	.007	.026	.057	.102	.161	.231	.314	.411	.520	.642
4	.005	.019	.043	.076	.120	.173	.239	.309	.390	.482
5	.004	.016	.035	.062	.097	.139	.189	.246	.312	.385
6	.003	.012	.029	.050	.080	.116	.158	.206	.260	.321
7	.003	.010	.024	.043	.069	.099	.135	.177	.224	.276
8	.002	.009	.023	.036	.061	.087	.118	.154	.194	.241
9	.002	.008	.019	.033	.054	.076	.104	.137	.173	.213
10	.002	.007	.017	.031	.048	.069	.094	.123	.156	.190
11	.002	.007	.015	.028	.043	.063	.085	.110	.140	.170
12	.002	.006	.014	.026	.040	.057	.078	.102	.130	.160
13	.001	.006	.013	.025	.037	.053	.071	.092	.118	.143
14	.001	.005	.012	.022	.035	.050	.066	.088	.111	.137
15	.001	.005	.011	.020	.031	.043	.062	.080	.102	.125
16	.001	.004	.010	.019	.029	.043	.059	.076	.097	.120
17	.001	.004	.010	.018	.028	.040	.053	.072	.091	.113
18	.001	.004	.010	.017	.027	.038	.052	.069	.087	.108
19	.001	.003	.009	.016	.025	.036	.049	.065	.081	.101
20	.0009	.003	.009	.016	.024	.035	.047	.062	.078	.097
22	.0008	.003	.009	.014	.022	.031	.043	.056	.071	.088
24	.0008	.0029	.0071	.0126	.020	.0289	.0392	.0513	.0650	.0802
26	.0007	.0029	.0066	.0118	.0183	.0266	.0362	.0474	.0600	.0740
28	.0007	.0027	.0061	.0109	.0171	.0247	.0338	.0440	.0557	.0687
30	.0006	.0025	.0057	.0102	.0160	.0231	.0314	.0410	.0520	.0641
32	.0006	.0023	.0053	.0095	.0148	.0200	.0280	.0378	.0470	.0590
34	.0006	.0022	.0051	.0090	.0141	.0203	.0277	.0362	.0459	.0566
36	.0005	.0021	.0047	.0084	.0132	.0190	.0260	.0336	.0430	.0528
38	.0005	.0020	.0045	.0081	.0126	.0182	.0248	.0324	.0410	.0506
40	.0005	.0019	.0042	.0075	.0120	.0170	.0230	.0290	.0370	.0461
44	.0004	.0016	.0038	.0068	.0100	.0150	.0208	.0270	.0330	.0400
48	.0004	.0015	.0034	.0060	.0090	.0130	.0181	.0240	.0300	.0370
54	.0003	.0013	.0029	.0053	.0081	.0128	.0172	.0224	.0285	.0345
60	.0003	.0012	.0027	.0046	.0072	.0110	.0150	.0199	.0250	.0300

Da, Db and E cover data essential to the figuring of ventilation. Illustrations of different types of rotation and discharge combinations to meet required conditions also are given herein.

Three Rules

It is sometimes desirable to make changes in a blower system to meet changing conditions of building occupancy, temperature changes, etc. There are three rules pertaining to blowers with which each electrical contractor and estimator should be familiar when contemplating making changes in these systems. These rules are as follows:

1. Volume varies directly as speed of fan:

$$\text{Delivery} = \frac{\text{new r.p.m. x old cu. ft. per min.}}{\text{old r.p.m.}}$$

2. Pressure varies as the square of the speed:

$$\text{New pressure} = \frac{\text{original pressure x square of new r.p.m.}}{\text{square of old r.p.m.}}$$

3. Horsepower varies as the cube of the speed (or capacity):

$$\text{New hp.} = \frac{\text{old hp. x cube of new r.p.m.}}{\text{cube of old r.p.m}}$$

In further illustration of the use of the tables given herein several typical lay-outs (with explanations) will be given. In Fig. 59 is shown a side elevation of a building with basement exhaust system installed. Fig. 60 shows a plan view of the same job. In this case the system consists of a blower, installed in the rear, with several suction pipes connected to the blower inlet. The discharge duct is run vertically on the outside of the building to a point above the roof line. A top cap is provided to prevent rain or snow from

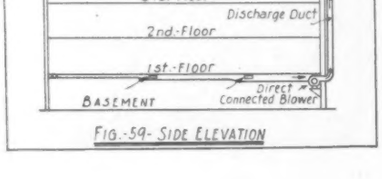


FIG.-59- SIDE ELEVATION

entering the duct. This is a common form of installation and one which the electrical contractor frequently may be called upon to engineer.

In the plan view of this job it will be noted that the main duct decreases in size at each branch. For example, we will assume that the main duct at blower inlet is 22 x 22 in. square, with

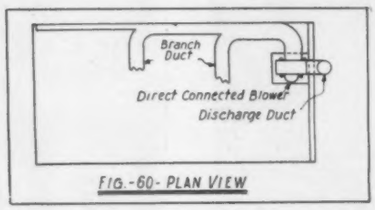


FIG.-60- PLAN VIEW

an area of 484 sq.in. The first branch (we will assume) is 10 x 12 in. with an area of 120 sq.in. By deducting 120 from 484 we have 364 sq.in., which is equivalent to a duct about 18 x 20 in. If the next branch duct is 12 x 12 in. or 144 sq.in. this is deducted from the 364 leaving a balance duct area of 220 sq.in., equivalent to a duct 15 x 15 in.

As each duct branches off the balance of the main duct is reduced proportionately, in order to get an equal distribution of air at the desired points.

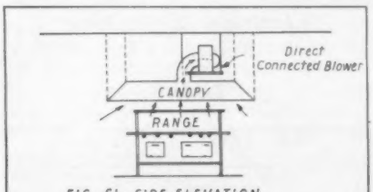


FIG.-61- SIDE ELEVATION

All bends should be made round and

Table E

AREA & CIRCUMFERENCE OF CIRCLES

DIAM. CIRCLE INCHES	AREA CIRCLE IN SQ.	CIRCUM. CIRCLE INCHES	DIAM. CIRCLE INCHES	AREA CIRCLE IN SQ.	CIRCUM. CIRCLE INCHES	DIAM. CIRCLE INCHES	AREA CIRCLE IN SQ.	CIRCUM. CIRCLE INCHES
10	78	3.14	21.0	346.36	65.97	41.0	1320.3	128.81
15	1.77	4.71	21.5	363.05	67.54	41.5	1352.7	130.38
20	3.14	6.28	22.0	380.13	69.12	42.0	1385.4	131.95
25	4.91	7.85	22.5	397.61	70.69	42.5	1418.6	133.52
30	7.07	9.42	23.0	415.48	72.26	43.0	1452.2	135.09
35	9.62	10.99	23.5	433.74	73.83	43.5	1486.2	136.66
40	12.57	12.57	24.0	452.39	75.40	44.0	1520.5	138.23
45	15.90	14.14	24.5	471.44	76.97	44.5	1555.3	139.80
50	19.64	15.71	25.0	490.87	78.54	45.0	1590.4	141.37
55	23.76	17.28	25.5	510.71	80.11	45.5	1626.0	142.94
60	28.27	18.85	26.0	530.93	81.68	46.0	1661.9	144.51
65	33.18	20.42	26.5	551.55	83.25	46.5	1698.2	146.08
70	38.49	21.99	27.0	572.56	84.82	47.0	1734.9	147.66
75	44.18	23.56	27.5	593.96	86.39	47.5	1772.1	149.23
80	50.27	25.13	28.0	615.75	87.97	48.0	1809.6	150.80
85	56.75	26.70	28.5	637.94	89.54	48.5	1847.5	152.37
90	63.62	28.27	29.0	660.52	91.11	49.0	1885.7	153.94
95	70.88	29.85	29.5	683.49	92.68	49.5	1924.4	155.51
100	78.54	31.42	30.0	706.86	94.25	50.0	1963.5	157.08
105	86.59	32.99	30.5	730.62	95.82	50.5	2003.0	158.65
110	95.03	34.56	31.0	754.77	97.39	51.0	2042.8	160.22
115	103.81	36.13	31.5	779.31	98.96	51.5	2083.1	161.79
120	113.10	37.70	32.0	804.25	100.53	52.0	2123.7	163.36
125	122.72	39.27	32.5	829.58	102.10	52.5	2164.8	164.93
130	132.73	40.84	33.0	855.30	103.67	53.0	2206.2	166.50
135	143.14	42.41	33.5	881.41	105.24	53.5	2248.0	168.08
140	153.94	43.96	34.0	907.92	106.81	54.0	2290.2	169.65
145	165.13	45.55	34.5	934.82	108.39	54.5	2332.8	171.22
150	176.71	47.12	35.0	962.11	109.96	55.0	2376.8	172.79
155	188.69	48.70	35.5	989.80	111.53	55.5	2419.2	174.36
160	201.06	50.27	36.0	1017.90	113.10	56.0	2463.0	175.93
165	213.82	51.84	36.5	1046.30	114.67	56.5	2507.2	177.50
170	226.98	53.41	37.0	1075.20	116.24	57.0	2551.8	179.07
175	240.53	54.98	37.5	1104.50	117.81	57.5	2596.7	180.64
180	254.47	56.55	38.0	1134.10	119.38	58.0	2642.1	182.21
185	268.80	58.12	38.5	1164.20	120.95	58.5	2687.8	183.78
190	283.53	59.69	39.0	1194.60	122.52	59.0	2734.0	185.35
195	298.65	61.26	39.5	1225.40	124.09	59.5	2780.5	186.93
20.0	314.16	62.83	40.0	1256.60	125.66	60.0	2827.4	188.50
20.5	330.06	64.40	40.5	1288.20	127.24	60.5	2874.8	190.07

Table D-b

PRESSURE REQUIRED IN INCHES OF W. G. TO OVERCOME FRICTION LOSS PRESSURE LOSS PER 100 FT. DUCT

DUCT DIAM. INCHES	VELOCITY IN FEET MINUTE.									
	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
3	.900	1.221	1.595	2.020	2.568	3.00	3.70	4.00	4.80	5.70
4	.676	.916	1.196	1.515	1.927	2.30	2.70	3.20	3.80	4.335
5	.540	.733	.958	1.212	1.542	1.85	2.20	2.60	2.90	3.460
6	.450	.611	.798	1.010	1.285	1.50	1.80	2.20	2.60	2.890
7	.386	.524	.684	.867	1.101	1.30	1.50	1.70	2.15	2.476
8	.338	.458	.598	.758	.964	1.15	1.35	1.60	1.90	2.166
9	.300	.407	.532	.674	.855	1.00	1.20	1.33	1.60	1.927
10	.270	.367	.479	.607	.770	.925	1.10	1.30	1.45	1.734
11	.246	.330	.430	.550	.660	.800	.970	1.17	1.35	1.50
12	.225	.305	.380	.500	.642	.750	.900	1.10	1.30	1.433
13	.208	.280	.320	.460	.570	.700	.800	.960	1.15	1.332
14	.193	.262	.342	.433	.550	.650	.750	.850	1.075	1.237
15	.180	.245	.312	.400	.495	.590	.700	.825	.970	1.10
16	.169	.229	.298	.379	.482	.575	.675	.800	.950	1.084
17	.161	.215	.285	.350	.440	.530	.625	.725	.845	.970
18	.150	.203	.266	.337	.427	.500	.600	.665	.800	.964
19	.139	.190	.250	.325	.385	.460	.560	.660	.770	.900
20	.135	.180	.230	.300	.370	.450	.520	.620	.725	.860
22	.121	.167	.217	.270	.330	.400	.480	.550	.660	.750
24	.112	.153	.200	.245	.308	.365	.430	.525	.600	.725
26	.105	.140	.180	.220	.270	.330	.400	.470	.548	.660
28	.096	.131	.168	.210	.250	.320	.375	.450	.515	.618
30	.090	.120	.160	.198	.240	.300	.350	.410	.480	.550
32	.085	.112	.148	.185	.218	.275	.320	.385	.440	.500
34	.079	.108	.138	.170	.210	.260	.310	.370	.420	.480
36	.073	.101	.128	.165	.200	.230	.290	.345	.400	.450
38	.070	.096	.125	.153	.190	.225	.280	.320	.375	.425
40	.067	.090	.120	.150	.180	.220	.270	.310	.350	.400
44	.060	.088	.108	.140	.160	.208	.230	.280	.330	.375
48	.055	.075	.096	.120	.151	.180	.220	.250	.300	.340
54	.050	.065	.086	.104	.132	.162	.188	.230	.270	.300
60	.044	.060	.078	.100	.120	.150	.170	.210	.240	.265

of the maximum sweep which the structural conditions of the building will permit. Avoid all sharp angles, to reduce friction to the minimum.

The greater the amount of duct work used, the greater is the friction or resistance to the air travel. This may be overcome by increasing the speed of the blower, thus building up the pressure.

Blower systems also may be installed for blowing in tempered warm air. In this type of installation the principle remains the same, except that the blower is reversed so that the fresh air is drawn in at the suction side and blown out at the discharge side. Heating coils are installed at either suction or discharge side of the blower of sufficient capacity to raise the temperature of the discharged air to the desired degree. By installing a filter system dust and dirt can be eliminated up to 90 or 95 per cent.

Blowers can be installed in almost any position and in very cramped areas. In Fig. 61 is shown a small blower set on a platform suspended from the ceiling. The suction side is connected to a canopy over a range. Fig. 62 is a plan view of this same job, showing how the discharge end is extended through the wall and then vertically to the roof. Figs. 63 and 64 show a similar system, except that the blower is set on a platform on the side wall and the suction side is connected to a duct extending to the range hood. The discharge side is again connected to a vertical duct to the roof. At the top of this duct a weather cap should be installed. This cap should be placed above the end of the duct a distance equal to at least

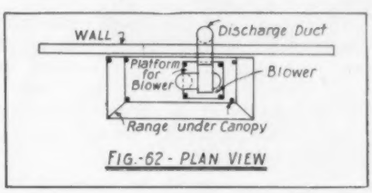


FIG.-62 - PLAN VIEW

one-half the diameter of the duct used. For example, if a 24-in. duct is used, the cap should be placed not less than 12 in. above the end of the duct.

The specifications prepared for ventilation systems to be installed in municipal or government buildings

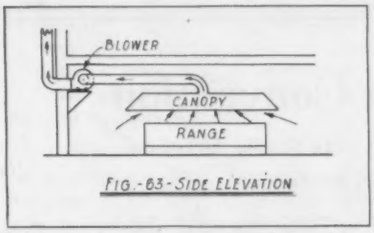


FIG.-63-SIDE ELEVATION

usually can be relied upon to be examples of the highest class of installation possible to be obtained. The contractor who makes an installation based upon these specifications has the assurance that he is giving his customer about the best that money can buy. For

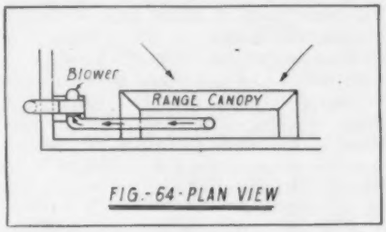


FIG.-64-PLAN VIEW

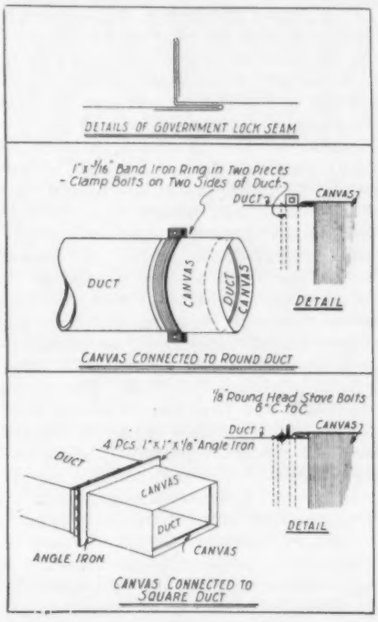
the informative value it may contain, a typical specification prepared for the Los Angeles School Board is given below:

Ventilation Specification

All sheet metal shall be Toncan or Armco brand, of weights specified on drawings.

Collars of canvas shall be installed in ducts as detailed. (See sketches.) All ducts shall be made up with government lock seams, riveted on. (See sketches.) Rivets shall be on 6-in. centers. When any dimension of rectangular ducts exceeds 18 in., ducts shall be braced at 28-in. intervals with government lock seams riveted on. The braces shall be not less than 1 in. deep for seams up to 36 in., and 1¼ in. deep for greater span. The joints shall extend clear around the pipe and each end shall be lapped and riveted. All four sides of ducts shall be cross crimped.

Inserts or hangers, as approved, shall be installed at 7-ft. intervals, as directed, for securely supporting the ducts in the required positions, and ducts shall be so braced that they will not be permitted to swing or sag. All ducts shall be so constructed that they will swing free from vibration and noise and stand straight. Care shall be taken to make all ducts true and straight and all of the joints smooth. No obstructions, edges or braces shall be permitted inside of any duct. Hangers shall be not less than No. 18 gage iron, 1 in. wide.


DETAILS OF GOVERNMENT LOCK SEAM
1"x 3/16" Band Iron Ring in Two Pieces - Clamp Bolts on Two Sides of Duct
DUCT
CANVAS
DETAIL
CANVAS CONNECTED TO ROUND DUCT
1/8" Round Head Stove Bolts 6" C. to C.
4 Pcs. 1"x1"x1/8" Angle Iron
ANGLE IRON
CANVAS CONNECTED TO SQUARE DUCT

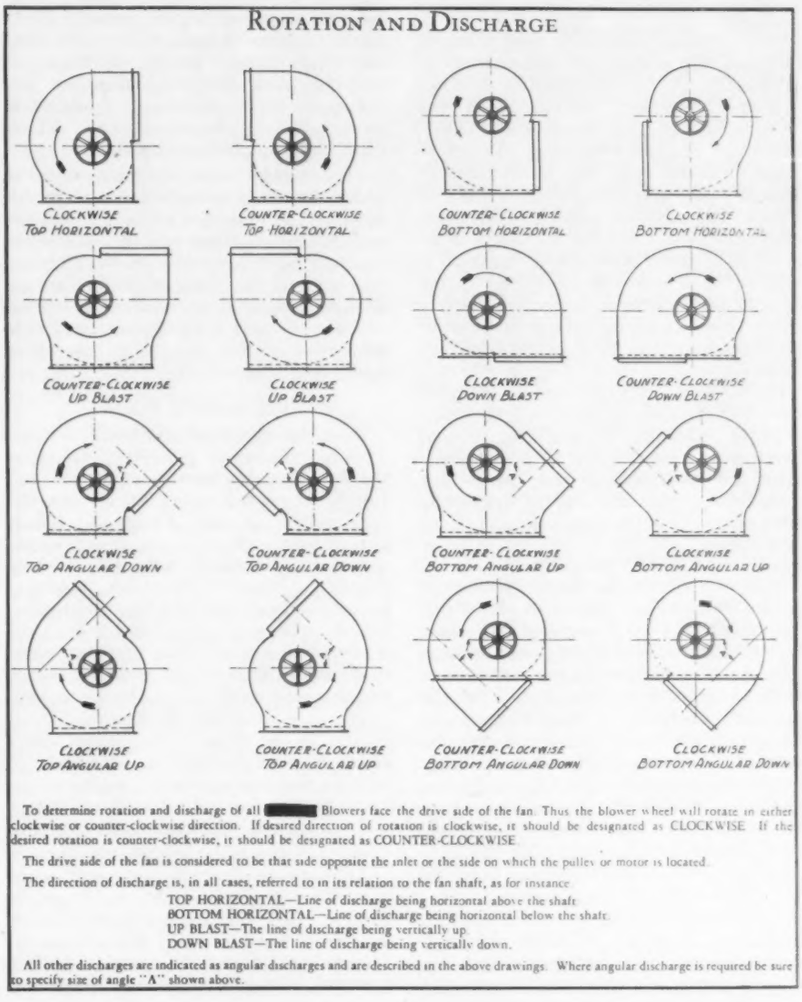
The next installment will deal with use of blowers for the conveyance of materials, such as sawdust, etc. Complete information regarding calculation of duct sizes, receivers, etc., will be given.

Hollow Shaft Irrigation Motor Developed

The evolution of the individual deep well turbine pumping unit for irrigation purposes brought about the development of the "vertical-hollow-shaft-type" motor, a motor especially designed for the drive. Before the introduction of the hollow-shaft motor, it had been the usual custom to use a standard vertical motor, either belted to the pump or coupled through the motor shaft by a flanged coupling. The belt drive provided a flexible unit, but it proved an expensive and inefficient drive. When the motor was coupled to the pump shaft it was necessary to provide a thrust bearing on the shaft just below the coupling.

In the hollow shaft motor being brought out by Westinghouse, the shaft, as the name implies, is bored out from one end to the other. The pump shaft extends up through this hole and is coupled at the top of the motor shaft. The coupling is of the jaw type, one-half being screwed and keyed to the pump shaft and the other half being the top part of the motor shaft in which the corresponding slots are cut. Accidental reversal of power causing the motor to run backwards is liable to cause damage if there is not some provision for disengaging the coupling. The Westinghouse jaw-clutch is designed so that it automatically disconnects the motor from the pump shaft in case of reversal, thus providing full protection. Sufficient clearance is provided for this in the hood, and a collar on the coupling keeps the shaft centered after it is disengaged.

The motor is designed for full-voltage starting. The torques are more than ample for starting and accelerating.


ROTATION AND DISCHARGE
CLOCKWISE TOP HORIZONTAL
COUNTER-CLOCKWISE TOP HORIZONTAL
COUNTER-CLOCKWISE BOTTOM HORIZONTAL
CLOCKWISE BOTTOM HORIZONTAL
COUNTER-CLOCKWISE UP BLAST
CLOCKWISE UP BLAST
CLOCKWISE DOWN BLAST
COUNTER-CLOCKWISE DOWN BLAST
CLOCKWISE TOP ANGULAR DOWN
COUNTER-CLOCKWISE TOP ANGULAR DOWN
COUNTER-CLOCKWISE BOTTOM ANGULAR UP
CLOCKWISE BOTTOM ANGULAR UP
CLOCKWISE TOP ANGULAR UP
COUNTER-CLOCKWISE TOP ANGULAR UP
COUNTER-CLOCKWISE BOTTOM ANGULAR DOWN
CLOCKWISE BOTTOM ANGULAR DOWN
To determine rotation and discharge of all [redacted] Blowers face the drive side of the fan. Thus the blower wheel will rotate in either clockwise or counter-clockwise direction. If desired direction of rotation is clockwise, it should be designated as CLOCKWISE. If the desired rotation is counter-clockwise, it should be designated as COUNTER-CLOCKWISE.
The drive side of the fan is considered to be that side opposite the inlet or the side on which the pulley or motor is located.
The direction of discharge is, in all cases, referred to in its relation to the fan shaft, as for instance:
TOP HORIZONTAL—Line of discharge being horizontal above the shaft.
BOTTOM HORIZONTAL—Line of discharge being horizontal below the shaft.
UP BLAST—The line of discharge being vertically up.
DOWN BLAST—The line of discharge being vertically down.
All other discharges are indicated as angular discharges and are described in the above drawings. Where angular discharge is required be sure to specify size of angle "A" shown above.

News of the Industry

Spokane Is Host to A.I.E.E. Coast Convention

Lightning and Communication Studies Head Research Subjects While Practical Operating Problems Command Their Share of Attention

A VARIETY of problems ranging from the more academic to the exceedingly practical were nicely balanced in the program of the seventeenth annual Pacific Coast A.I.E.E. Convention at the Davenport Hotel, Spokane, Aug. 28-31, 1928. About 250 delegates and guests registered, including a number of students from Pacific Coast colleges and universities, many of whom took part in the two half-day student sessions. Trips to many points of interest in and around Spokane were made a part of the program and many availed themselves of the opportunity to visit power stations and industrial installations in the intervals between technical sessions.

The principal entertainment features included the annual golf tournament at which George Luther, Electric Storage Battery Company, Seattle, won the Fisken cup, and the banquet and entertainment Thursday evening. The Spokane Section, A.I.E.E., with John B. Fisken of The Washington Water Power Company as general convention chairman, was host for the convention.

In 1929 the Pacific Coast convention will be held under the auspices of the Los Angeles Section, either in the city or nearby, according to the dictates of conditions at that time. The time has been set tentatively as Aug. 27-29, subject to final confirmation at a later date. This date is expected to prove popular because it permits student branches to participate in the convention and also permits the Labor Day week-end to be utilized for travel by those who come from greater distances.

First Student Session

Following the opening remarks of R. F. Schuchardt, president, in which he commended the holding of one meeting yearly on the Pacific Coast because of the outstanding achievements of electrical engineers in this section of the country, Prof. F. O. McMillan of the Oregon State College presided over the first student technical session.

The three papers outlining studies on the Fynn-Weichsel motor were prepared by N. C. Clark of the University of California, O. K. Stigers of the University of Utah and Herman Reise of the University of Washington. These reports indicated that the line current, secondary current, tertiary current, power factor, slip and torque all assumed periodic veriations when the machine was loaded enough to pull out of step; that after a few changes in design the motor will operate successfully as a self-excited generator; and that it will operate satisfactorily as an a.c. generator under unity power factor conditions.

G. R. Crane and E. W. Templin of the California Institute of Technology, Pasadena, Calif., had made a study of the electrical characteristics of Neon discharge tubes, indicating that the positive column drop varied directly as the length and decreased exponentially with increasing current. Discussing the paper, D. W. Proebstel, of the Portland Electric Power Company, stated that his company had begun tests on Neon signs using as a basis a constant voltage with variable length of tubes and varying gas mixtures, such as are found in actual service, to determine power factor characteristics. These tests have not been completed.

The voltage ratio characteristics of audio-frequency transformers were determined by the use of a low-voltage cathode-ray oscillograph in tests made by Paul Klev, Jr., and D. W. Shirley, Jr., both of the Oregon State College. Results indicated that ratios are good between 40 and 3,000 cycles, and that saturation within the usual operating limits had little effect.

First General Session

Opening the first technical session Tuesday afternoon, Bradley Cozzens, of the Los Angeles Bureau of Power and Light, presented a report on the determination of sphere-gap and point-gap arc-over voltages by direct measurement. In these tests the current through a water resistor was recorded by an oscillograph, yielding results believed to be accurate within 2 per cent in measuring more than 1,000,000 volts to ground. This report recorded recent experiments made in collaboration with Prof. J. S. Carroll of Stanford University in the Ryan high-voltage laboratory at that institution. Methods of voltage measurement and results of the experiments were discussed at length and extensively illustrated with oscillograms, charts and photographs.

Among conclusions reached were that the water-resistor oscillograph method for voltage measurement is adaptable for use with 60-cycle transformer test sets for the measurement of arc-over voltages; that point gaps can be used for 60-cycle voltage measurements with an error of less than 10 per cent; and that the rapid decrease in kilovolts per inch necessary for the breakdown of gaps in excess of 9 ft. to ground establishes an approximate economic limit of high voltage for power transmission based upon present design practice. Discussion stressed the importance of using caution in accepting the results of the experiments without taking into consideration complete data as to clearances between surrounding objects and the nature of these objects. This point was recognized by Professor Carroll who asserted that the authors did not expect to have the calibrations given in the report set up as standard.

A study of the electrical characteristics of high-voltage Neon lamps by Prof. F. O. McMillan and E. C. Starr, of Oregon State College, took up in part the important problem of power-factor correction in geseous conductor lamps. The results of many tests yielded valuable data on the amount of capacitance required to improve power factor by the use of parallel capacitance on the low-voltage side, or series capacitance in the high-voltage circuit. Discussion raised the contention that the burden of correcting the power factor should be on the sign manufacturers.

In a paper discussing the automatic substation and its relation to the electric distribution system, prepared by S. J. Lisberger and presented by R. B. Kellogg of the Pacific Gas and Electric Company, the author discussed the application of the automatic station to urban and interurban railway power supply, to supply rural or isolated customers, to supply energy to a 220-volt d.c. Edison network, and to supply large metropolitan areas. A second part of the paper treated the design of the automatic substation with particular reference to securing economic arrangement of equipment, to facilitate quick inspection and location of faults, and to minimize fire risk. The main conclusion was that the automatic substation can be relied upon to deliver excellent service, particularly if proper precautions are taken in the design and installation. Discussion engaged in by delegates from other companies brought out the importance of such stations in safeguarding service and in securing a high degree of efficiency and economy in operation.

The session closed with a paper by R. H. Park and E. H. Banker of the General Electric Company, Schenectady, N. Y., on system stability as a design problem. This paper reviewed the factors affecting stability including generator short-circuit ratio, voltage regulators, excitation systems, neutral impedance, governors and condensers. Methods of calculating stability were given and a number of examples taken to illustrate how such calculations might be applied practically.

Second General Session

A description of the new electrolytic zinc plant of the Sullivan Mining Company at Kellogg, Idaho, was given by E. R. Fosdick of The Washington Water Power Company. The plant employs the Tainton-Pring electrolytic process which is based upon using acid strength of about 28 per cent and a current density of 100 amp. per sq.ft. A present capacity of 50 tons of zinc per day is secured by the use of two three-unit motor-generator sets each having a synchronous motor driving two 500-volt d.c. generators. The plant is designed to facilitate flexibility of operation so that refinements in the metallurgical processes can be added without making radical changes in the initial installation.

The Great Northern Railway electrification over the Cascade Mountains in western Washington was explained in a paper by E. L. Moreland and Ralph D. Booth, of Jackson & Moreland, consulting engineers of Boston. Resulting improvements in train time and the increased size of loads hauled over the electrified section are ample justification for the electrification now existing and projected. From the 25-cycle, 11-kv. trolley contact line power is taken through a motor-generator set on the locomotive and subsequently delivered at 600 volts d.c. to the traction motors. The speed of the driving motors is regulated through a field control system. Discussion led to the conclusion that this driving mechanism met conditions faced in this particular electrification problem but need not be considered standard for all railway electrifications. The merits of this type of drive as opposed to the straight d.c. drive also were discussed.

Power supply for railway signals and automatic train control with particular reference to the a.c. system and the apparatus commonly used to insure continuity of supply was the subject of a paper by C. F. King, Jr., of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. According to the author, the relatively simple automatic substations used in conjunction with a.c. systems (when the frequency of the signal energy is the same as the frequency of the primary supply) will be employed in increasing numbers as railway signaling and control systems are extended.

The advantages and disadvantages of mercury-arc power rectifiers were discussed in a paper by L. J. Turley of the Los Angeles Railway Corporation, together with the reasons which led to the choice of a double-unit automatic rectifier station for railway service in Los Angeles. Discussion brought out the fact that a similarly satisfactory installation of a 1,200-volt rectifier installation by the Portland Electric Power Company for railway service is leading to a serious consideration of an additional installation of mercury-arc rectifiers for the relatively lower voltage employed in Edison three-wire networks.

No session was held Wednesday afternoon, the time being set aside for the annual golf tournament for the John B. Fisken cup. In the evening Dr. C. E. Magnusson of the University of Washington presented a lecture on Lichtenberg figures. Slides illustrating some of the experiments carried on in the university laboratory aided the speaker in explaining the practical significance of experimentation in this field.

Second Student Session

P. E. Warrington of Stanford University reported on tests showing the effect of barriers in insulating oil. A. F. Betke and D. R. Stanfield of the University of Southern California told of an investigation to find experimentally the temperature rise in the neutral conduit of a three-phase, star-connected system. A discussion of the effect of power factor on central station revenues and on the customer's power cost was offered by H. B. Tinling, of Washington State College, in which the author reviewed prevailing rates of Northwest companies showing what effect a charge for reactive kva. had on power bills. The economics of power factor correction, and the relative merits of various types of corrective equipment were discussed. L. W. Curtis, of the University of Idaho, presented the results of an experiment to determine which harmonics, if any, are introduced in the phase voltages of an induction regulator when delivering power to an unbalanced load.

Third General Session

One of the most valuable papers to be presented was that describing the movements of overhead line conductors during short-circuit conditions. This paper was prepared by Wm. S. Peterson and H. J. McCracken, Jr., of the Los Angeles Bureau of Power and Light, and described a comprehensive series of tests in which the actual paths of conductors thrown into motion by short-circuit forces was charted by a unique photographic method. Heretofore voltage has been the principal factor in determining conductor spacing, but the tests showed that the movements under short-circuits are an additional important factor. Tabulated data covering 330 tests were given in the paper showing conductor movement under a wide variety of conditions as to conductor size, spacing, tension and value of single-phase short-circuit current.

Discussion brought out that many operating companies have experienced difficulties from this phenomenon due to failure to take this factor into consideration in the original design of the lines, and that often city building regulations coupled with great reconstruction expense precluded the possibility of undertaking correction by the obvious means of shortening spans, widening spacings, and increasing conductor sizes and tensions. Other solutions offered were the introduction of reactances in the line to reduce short-circuit cunrrents, and the placing of insulated spacers between conductors in the middle of spans to cut the effective span length in half. One company has successfully employed the latter method of correction to heavily loaded 2.3-kv. circuits. It was advanced by some that three-phase "shorts" might show entirely different results of movements of conductors, but that the single-phase tests described probably represented the maximum conditions of movement that could be produced. Data presented in the paper should prove invaluable in designing overhead lines.

Another paper arousing considerable commendation was that of Prof. E. A. Loew, of the University of Washington, showing how a direct method may be applied to the solution of the general problem of transmitting any assumed load over a line of any assumed length by the use of any one of the available kinds of aluminum or copper conductors. Suitable constants are provided and equations given for their evalution to cover the variables existing in the problem. A set of calculated curves was given, from which the most economical line voltage and the most economical conductor may be found for transmission line projects of assumed lengths and loads. Discussion raised questions as to the functional classification of some of the constants involved, which the author defended successfully in rebuttal. Commendation was offered by operating engineers who stated that the method advocated in the paper would eliminate much of the uncertainty of the older trial-and-error method.

The use of a single artificial transmission line in obtaining laboratory proof of calculated electrical relations in transmission lines was discussed in a paper by Prof. H. V. Carpenter, of Washington State College. From the experiments, curves were produced showing the performance of lines at 300 kv. up to 650 miles in length and under different load conditions. Primary application of the experiments was to study the use of synchronous condensers, shunted reactances and series condensers for improving the line's performance. Discussion stressed the great facility these experiments had for making such analyses of line performance under different conditions as might be desired.

Just how the different connections of stations in a transmission and distribution network affect the flow of residual currents in the line was shown in a paper by L. J. Corbett, of the Pacific

Gas and Electric Company, San Francisco. Oscillograms were shown to verify the theory presented. In the discussion, the fact that a change of 1 per cent in voltage applied to a transformer makes a change in triple harmonics of from 5 to 15 per cent was stressed, and hearers were cautioned that the solutions offered in the paper covered specific conditions and could not be said to apply universally to the general problem.

Fourth General Session

Problems in power-line carrier telephony and a description of a new carrier telephone system for toll circuits were brought before the delegates through three papers. Dr. L. F. Fuller, of the General Electric Company, in a paper prepared jointly with W. A. Tolson of the same company, classified modern carrier equipment into four classes: the primary station equipment, with full automatic control and preferred lines; the secondary equipment, less completely automatic and less expensive than the primary; booth equipment for installation along the line, and still more limited in performance; and portable equipment weighing 15½ lb. for use of patrolmen at points along the line where transmission equipment is mounted on the poles.

Further treatment of the subject was given in a paper by W. V. Wolfe and J. D. Sarros of the Bell Telephone Laboratories, New York. The authors discussed the extremely difficult problems encountered in applying carrier telephone communication to the 220-kv. Pitt River line of the Pacific Gas and Electric Company and described the single-sideband suppressed carrier that was successfully applied. In an animated discussion, differences of opinion developed as to the cause of the high noise level experienced and the manner of its reduction. One written discussion forwarded to the meeting stated that the noise was due not to line modulation from corona effect on the conductor itself, but to the type of corona shield used, and that there seems no necessity for departing from standard carrier communication practice. Another expressed the opinion that the noise reduction was due to capacity coupling. J. P. Jollyman, of the Pacific Gas and Electric Company, stated in a written discussion that the system described in the paper had been in service three months without maintenance and without interruption, and that the service it had rendered had been entirely satisfactory. Mr. Sarros, in summing up, said that there had been no endeavor to develop a new system, but only to apply proved practice in carrier-current telephone communication to power-line communication, since the problems are not essentially different.

A new carrier telephone system, designed to substitute for open-wire circuits of shorter length than heretofore have been economical, was described in a paper by H. S. Black, of the Bell Telephone Laboratories, and M. L. Almquist and L. M. Ilgenfritz, of the American Telephone & Telegraph Company. This is the Type D system and provides one additional talking circuit per pair of wires and was reported as especially adapted to supply temporary facilities promptly. About 125 Type D installations are now in service operating principally over distances of from 75 to 200 miles.

Fifth General Session

A. L. Atherton, of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., discussed high-voltage phenomena in thunderstorms, reviewed the results of the Klydonograph studies of lightning voltage surges, and suggested an investigation of the voltage-time relations for lightning voltages through the cathode-ray oscillograph. Calling attention to the tremendous effort made by small groups to determine the characteristics of lightning surges and to design protection for them, the author entered a plea that future investigation of the problem be undertaken by a combined industry, co-ordinated through a national body. Discussion centered around the possibility of protecting against lightning out on the line instead of at the station. Attention was called also to the many services, commodities and natural resources on which lightning exerts a destructive force, and the fact that the government was interested in the study of lightning protection from many angles was offered as an additional reason for combining future studies under one co-ordinated group.

An analysis of lightning phenomena occurring in nature, in the light of results obtained in the laboratory, was the subject of a paper prepared by M. A. Lissman, of Stanford University, and presented in his absence by Prof. J. S. Carroll. The electrical properties of atmosphere with respect to its conductivity and the characteristics of the discharge of the lightning flash with its formation of streamers were considered. In the discussion which followed it was pointed out that such research should be stimulated, since it forms the basis of the research suggested in Mr. Atherton's paper which preceded.

Prof. N. P. Bailey, of the University of Idaho, presented an experimental method of verifying by electrical analogy the theoretical method of calculating the heat resistance of the earth surrounding underground cable ducts. He pointed out that the present state of knowledge about the flow of heat from cable ducts is far behind what it should be and that the paper did not prove a conclusive solution, but simply opened the way for further experimentation and study. In summing up after discussion the author showed results of a test on the cables at the Chelan power house of The Washington Water Power Company where the surface of the ground reaches very high temperatures during the warm summer days. These tests indicated that during the day the heat flowed from the surface toward the duct.

Corrosion of cable sheaths in creosoted wood conduits, the determination of the cause of it, and the treatment of the duct for its removal, was the subject of a paper by R. M. Burns, of the Bell Telephone Laboratories, New York, and B. A. Freed, of the Pacific Telephone and Telegraph Company, Seattle. Cable sheath corrosion was found to develop in time after the introduction of Douglas fir duct on the Pacific Coast in 1911. Tests showed the corrosion to be formed by the action of the acetic acid in the wood on the lead of the sheath. Reduction of this corrosion was effected by the introduction into the duct of an air-ammonia mixture containing about 2 per cent ammonia.

Discussion brought out that some woods are more acetic than others; that ammonia treatment of the duct would not reach the acid contained inside the wood within the exposed surfaces, and that corrosion occurs to a lesser degree in wood duct in which the creosote treatment has completely permeated the wood. Three courses of correction were offered in summing up: (1) use of a wood with a low acid content, such as hemlock; (2) change in treating process to secure a more nearly 100 per cent permeation; and (3) introducing a compound with the creosote treatment to neutralize the acid.

Suggests Uses for Profits of Light Department

The annual profits to the City of Pasadena from its Municipal Light and Power Department, amounting to more than $500,000, should be used to erect a civic auditorium, provide an airport and develop a park in one of the mountain canyons adjacent to the city, according to a statement made by Robert L. Daugherty, city director, in speaking to an association of business men in Pasadena recently.

"The light department," said Professor Daugherty, "showed a profit of $522,243 last year, and an even greater profit will be realized this year with the installation of the new unit which will generate power for 30 per cent less cost than in previous years."

The city director stated that it is highly important to retain the good will of private power corporations and that if Pasadena should reduce its light rates, this good will would be lost and in case of emergency the city would be unable to use the facilities of the power company.

Edison Company Sets 5-Year Budget of $130,000,000

During the next five years the Southern California Edison Company, Los Angeles, expects to spend $130,000,000 for new construction and improvements, according to R. H. Ballard, president. Of this amount $95,000,000 will be spent for distribution facilities.

Approximately $138,000,000 was spent by the company during the last five years, about 75 per cent being used in increasing its generating capacity.

Two Portland Companies Reduce Power Rates

Reduction in power rates for customers having an average demand of 375 kw. or more, amounting to from 10 to 30 per cent depending on the load factor, was offered Sept. 18 to industrial users in Portland by the Portland Electric Power Company and the Northwestern Electric Company. This reduction was made voluntarily and largely at the instigation of the industries committee of the Chamber of Commerce, which had undertaken a study of rate schedules in Pacific Coast cities and had conferred with company officials concerning the matter. Report of this study submitted by J. P. Newell, consulting engineer, Portland, and George W. McMath, chairman of the industries committee, indicates that the new rates place Portland in a favorable position with respect to existing power rates on the Coast.

The new rate, which encourages high load factor utilization, reduces the top step from 5 cents to 3.5 cents per kw.-hr., and the lowest step from 8 mills to 2½ mills. An additional reduction in the new rate is found in the permission to combine lighting load amounting to as high as 25 per cent of the power demand. The old 5 per cent prompt payment discount has been abolished under the new schedule. The reduction will save present power users in Portland between $60,000 and $70,000, based on 1927 consumptions of the customers affected. A new tariff is to be filed immediately with the Public Service Commission of Oregon, which is expected to approve the reduced schedule.

Street Lighting Rates in Los Angeles Reduced

Permission has been granted by the California Railroad Commission to the Los Angeles Gas & Electric Corporation to reduce its charges for ornamental street lighting in the City of Los Angeles from 4 cents per kw.-hr. to 3½ cents.

The action of the commission is the result of investigation following the suspension of a reduction of about 25 per cent in the ornamental street lighting rate proposed by the company last summer, which would have set the rate at 3 cents. The commission found that the reduction in the ornamental lighting rate would amount to but $8,000 a year and would not benefit the general electric consumer of the company as this class of business comprises only about 1 per cent of the electric revenue of the company. On the other hand, the commission pointed out that a reduction in its commercial or domestic lighting schedules would benefit a large number of consumers. Accordingly, the commission indicated that the company may see fit to tender a reduction in its other electric schedules, with the understanding that if it does not do so within a reasonable time the commission will be in a position to re-open the proceedings and to make a final determination with respect to other rates.

The Los Angeles Bureau of Power and Light has filed new rate schedules with the City Council, reducing its ornamental street lighting rate to the figure set by the Railroad Commission for the Los Angeles Gas and Electric Corporation, and making reductions in other classes of service.

Arizona Plans Development on Little Colorado

Arizona's board of directors of state institutions has applied to the Federal Power Commission for a preliminary permit covering the site on the Little Colorado River, near Flagstaff.

It is proposed to construct a dam at the Tolchico site, with an alternate proposal of two dams so as to provide for the ultimate development from the Tolchico site to the Colorado. This would provide a head of 2,000 ft. The proposed reservoir would have a capacity of 700,000 acre-ft., but the applicants do not estimate the power would be made available. This is the fifth application made by the board in the development of its systematic plan for the harnessing of the river.

Company Completes 110-Kv. Transmission Line

The placing in operation of the San Joaquin Light & Power Corporation's 110-kv. line from its Midway steam plant at Buttonwillow to Corcoran marks the completion of that company's transmission line project in Kern County and the southern San Joaquin Valley. The recently completed 50-mile line ties in with the line from Taft to Midway, finished last July, making a 72-mile direct line reinforcing the main transmission system down the entire west side from Taft to Corcoran. A portion of the line from Midway to the Semitropic substation, which serves the Wasco and Shafter territory, has been in service also since last July.

The new line, which is about 90 miles long and cost approximately $1,000,000, was made necessary by greatly increased demand for power throughout Kern County and portions of Kings County, according to company officials.

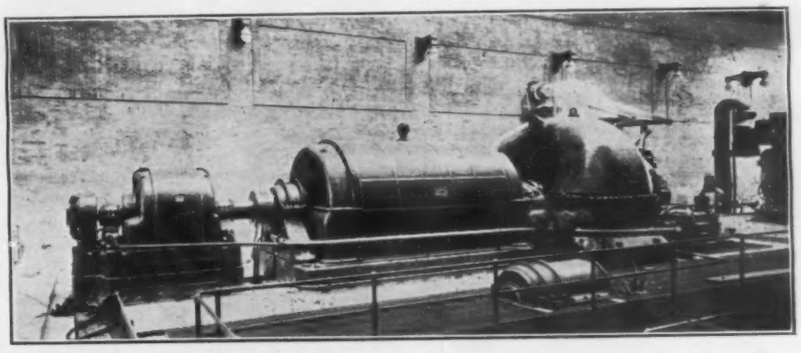
Transmission Line Completed—A 14-mile transmission power line from the Don Pedro power house to Merced Falls recently was completed by the Turlock Irrigation District, Turlock, Calif., at a cost of approximately $65,000.

Control of Coast Counties Gas & Electric Company Acquired by A. E. Fitkin

THROUGH the purchase of the outstanding common and second preferred stock of the Coast Counties Gas & Electric Company, San Francisco, control of that company has passed from S. Waldo Coleman, president, and his associates, to A. E. Fitkin of A. E. Fitkin & Company, San Francisco. Consummation of the deal marks the withdrawal of Mr. Coleman from public utility operation and the removal of one of the few remaining independently operated power companies in California. Mr. Fitkin has stated that there will be no change in the present organization of the company but that it will be under the active supervision and management of the United States Engineering Corporation, which is the Fitkin operating company. The official personnel has not yet been announced.

As of Dec. 31, 1927, the total assets of the Coast Counties Gas & Electric Company amounted to $8,494,250. Its statement of earnings last year showed gross profit of $1,836,597, and after deducting all charges, a surplus for dividends of $337,889. The company serves about 50 communities with a total population of approximately 81,000.

Mr. Fitkin formerly had wide public utility interests in the East and Middle West which he sold out a little over a year ago. In addition to the newly acquired Coast Counties company, Mr. Fitkin owns, controls and manages The California Consumers Company, holding company for a number of southern California ice and ice cream organizations.



New 48,000-hp. turbine put into operation at the Seal Beach plant of the Los Angeles Gas and Electric Corporation Aug. 1. This unit cost approximately $2,000,000.

Lodi City Council Adopts New Rate Schedule

Under the terms of an ordinance recently adopted by the City Council of Lodi, Calif., reductions in electric rates charged by that municipality will become effective Oct. 1.

Under the new schedule the lighting rate for the first 30 kw.-hr. will be 4 cents per kw.-hr.; for the next 40 kw.-hr., 3 cents; for the next 80 kw.-hr., 2 cents; for all above 150 kw.-hr., 1 cent; plus a service charge of 50 cents. Under the previous schedule a consumer who used in excess of 250 kw.-hr. received the benefit of the 1-cent rate. Under the new schedule the 1-cent rate becomes applicable on all amounts exceeding 150 kw.-hr. For domestic consumers the reduction amounts to about 10 per cent, and the householder who formerly paid $6 now will pay $5.50 for the same amount of energy. The service factor of all residences is fixed at 1 kw.

The rates applicable to general commercial and industrial power service and to commercial heating and cooking are as follows: For the first 50 kw.-hr. per hp., 4 cents; for the next 50 kw.-hr., 2.1 cents; for the next 150 kw.-hr., 1.3 cents; and for all over 250 kw.-hr., 9 mills. The user of 2,500 hp. and over will receive a rate that ranges from 1.8 cents per kw.-hr. to 6 mills for power used in excess of 250 kw.-hr.

New rates for industrial heating, cooking and water heating have been established with a view to increasing this class of business for the city's electric department. The city's bid for this business will figure an average rate of about 1¾ cents per kw.-hr. for current as ordinarily used and about 1¼ cents or less if used in the "off-peak" period between 5 p.m. and 9 p.m..

Two Edison Company Plants to Be Made Automatic

Plans have been completed by the Southern California Edison Company to rebuild entirely its Kaweah No. 1 and No. 2 hydro-electric plants and make these two units entirely automatic. Kawean No. 1, with a capacity of 1,900 hp., was built in 1899. This plant has three generators and is one of the oldest hydro-electric plants on the Edison system. Kaweah No. 2 was built five years later and also has a capacity of 1,900 hp.

The changing of these two plants into full automatic will effect considerable economy in operating cost. The No. 1 plant now has an operator on shift at all times. In the new plant there will be only one unit installed with a capacity of 3,100 hp., and the full automatic equipment will eliminate the necessity of having any operator in the plant. Ordinary interruptions occurring will throw the generator off the line, and when normal conditions have been restored it will go back on the line automatically. There will be one operator at power house No. 2 who will be able to take care of both plants. At the No. 2 plant the old 1,900-hp. equipment will be replaced with one single unit with a capacity of 2,500 hp.

Approximately $160,000 will be spent on changing over the two plants, which are about one and one-half miles apart. Their output is used to help take care of the demands of the San Joaquin Valley territory.

An Identifying Badge

This badge, in silver and blue with the seal of the company in gold and brown on a white field, is supplied by the San Joaquin Light & Power Corporation, Fresno, Calif., to all its meter readers, collectors, inspectors and service men. The badge serves not only as a protection to customers against frauds who represent themselves as employees of the company but also as a means of identification of any employee wearing it.

Southern Sierras Company Reduces Its Rates

Substantial rate reductions amounting to approximately $175,000 annually were voluntarily placed in effect on Sept. 9 by The Southern Sierras Power Company, Riverside, Calif., following the filing of new schedules by the company with the California Railroad Commission. These schedules are based on studies made by representatives of the power company and the California Farm Bureau Federation during the past two months.

Spread of reductions under the new schedules, according to the announcement, will affect lighting charges by approximately $82,000 annually; heating and cooking, $23,000; agricultural power, $41,000, and industrial power (Imperial Valley) $24,000.

In authorizing this voluntary reduction the commission called attention to the fact that the company has pending before that body an application for a revaluation of its properties and an increase of its rates, based upon evidence presented by the company indicating that the revaluation would result in a revision upwards in the rates if a fair return upon its claimed valuation is allowed. The commission authorized the reduction, subject to whatever bearing such reduction may have upon the pending proceedings.

California Utility Plans to Build Four Plants

Application has been made to the California Railroad Commission by the Pacific Gas and Electric Company for authority to construct a hydro-electric development project on the North Fork of the Mokelumne River and its tributaries. The plan contemplates the utilization of the flow of the North Fork as regulated through a system of storage reservoirs from the headwaters to the tail-water elevation of the company's existing Electra power plant. It is planned to construct a chain of four or more hydro-electric power plants, having a total installed capacity of approximately 147,000 kva.

There are at present five storage reservoirs in connection with the Electra plant, and it is proposed to erect three in addition.

"League in Opposition to Water and Fish Bills" Organized in Oregon

FIRST organized opposition to the four bills initiated in Oregon to close to further appropriation certain game-fishing streams of the state developed at a meeting in Portland Sept. 11, which was called by the Eugene Chamber of Commerce and resulted in the formation of the "League in Opposition to Water and Fish Bills." Present at the meeting were representatives from several chambers of commerce throughout the state, from the grange and farmers' unions, from industrial concerns and a utility company.

After a discussion of the merits and demerits of the bills under consideration, a permanent organization plan for the league, as recommended by a committee appointed for the purpose, was adopted, and, pursuant to this plan, officers and executive committee were elected, as follows: president—J. E. Shelton, president, Eugene Chamber of Commerce; secretary—T. J. Flippin, secretary-manager, Eugene Chamber of Commerce; and executive committeemen—C. C. Chapman, editor "Oregon Voter," Portland, and representative of the Portland Chamber of Commerce; J. C. Vandevert, president, Isaac Walton League of Bend; and J. R. Harvey, secretary-manager, Grants Pass Chamber of Commerce.

Membership in the league is open to representatives of any organization in the state that desires to ally itself with the league for the purpose of defeating all or any of the four bills. The executive committee commenced to lay immediate plans to gather and disseminate data, facts and argument tending to show that passage of the bills would retard the development of the state.

The four bills that the league hopes to defeat are those initiated by certain sportsmen's organizations, designed to prohibit further appropriation of water for commercial or municipal purposes from the Rogue, Umpqua, Mackenzie and Deschutes Rivers and their tributaries. (Electrical West, Aug. 1, 1928, p. 106.)

Insull Medal Presented to Edison Co. Employee

Fred L. Jones, lineman from the Compton district of the Southern California Edison Company, has been honored by having awarded to him the Insull Medal for saving the life of a fellow employee, Charles H. Smith, groundman, after the latter had come

Fred B. Lewis, vice-president and assistant general manager, Southern California Edison Company, pinning Insull Medal on Fred L. Jones, company lineman.

in contact with a live wire. Mr. Smith while tending reels received an accidental shock from a 40-kv. circuit. Mr. Jones was the first to reach him and found him apparently dead. After a hurried examination he started resuscitation work by the prone-pressure method. After about ten or twelve minutes Mr. Smith began to show signs of life and was soon breathing normally. His burns were not serious and after five or six days he was again able to work.

Fred B. Lewis, vice-president and assistant general manager in charge of operation for the Edison company, representing Samuel Insull, the donor of the award, presented the medal to Mr. Jones. The presentation was made at an enthusiastic meeting of employees and townspeople who had gathered together at the Fullerton High School, Fullerton, Calif., for the purpose of seeing the finale of the Edison First Aid teams' contest.

Utility to Begin Vancouver Construction Program

Announcement has been made by the British Columbia Electric Railway Company that the following construction will be started immediately in the Greater Vancouver district: two 6,000-kw. transformer banks, four high-tension oil circuit breakers, and several induction feeder regulators will be installed at the Point Grey substation at a cost of $140,000. Three 500-kw. transformers will replace the 250-kw. transformers at Trimble St. substation, at a cost of $14,000. Construction on a new substation at West Vancouver at a cost of $20,000 will be started immediately. New transfer banks for handling the increased light and power load are being erected in the Horne Payne substation at a cost of $35,000. A 500-kw. rotary is being installed at the Chilliwack substation, where several other improvements are being made. The 300-kw. rotary at Chilliwack is being moved to the Sumas substation and a second high-tension line between Chilliwack and Sumas is being erected.

Contract has been let by the company for the erection of 20 steel and concrete piers which will form the foundation of the new $250,000 distributing station on Government and Bay Sts., Victoria. Its total capacity will be 20,000 kw.

Across-the-Table Discussions Feature Wyoming Utility Convention

THE most successful convention in its history was held by the Wyoming Utility Association at Casper, Aug. 17-18. Approximately 70 per cent of the utilities of the state was represented at the gathering, which was held at the auditorium of the Mountain States Power Company.

In keeping with the policy adopted two years ago by the utilities of Wyoming, Colorado and New Mexico, not one speech was made from a manuscript. Each person who addressed the convention did so without the aid of papers or notes. Comparatively few addresses were made, as the various sessions on both days were largely made up of across-the-table discussions. Virtually every delegate participated in one or more of the discussions.

The convention got well under way with a spirited talk by Guy W. Faller, a vice-president of the Public Service Company of Colorado, Denver. The speaker pointed out that "socialism and communism have become firmly entrenched for a battle against the public utility industry and business in general." During the course of his talk, Mr. Faller said, "The public utilities of the nation are in fact shock troops which are protecting every line of business and industry. Other businesses and industries may not realize that their battle for existence under the provisions of the constitution of the United States is being fought for them by the utilities. If the utilities' front line happens to cave under the determined onslaught of those opposed to private enterprise, other lines of business will be obliged to take up the fight as never before."

The value of public utility conventions was stressed by H. L. Williams, Utah Light & Power Company, Evanston, Wyo. He said: "Conventions such as this are merely trading places for utility ideas. Every delegate passes on to all others the best methods and ideas, with the result that all delegates carry back to their respective localities much valuable information which can be practically utilized."

George E. Lewis, executive manager, Rocky Mountain Committee on Public Utility Information, told the convention that much good to the utility industry has grown out of the Federal Trade Commission's inquiry. During the course of his address, Mr. Lewis said:

"It really required such action as that taken by the Federal Trade Commission convincingly to establish how well the public utilities really stand with their customers and the people generally. We have never possessed a rule by which we could measure the results of good-will advertising, talks by our employees and various other contacts which happened to be part of our public relations activities.

"It was to be expected that the inflammatory articles published by some of the papers of the nation would naturally considerably exercise the people. No such results ensued, however. The people have not become exercised over what the Federal Trade Commission inquiry has developed.

"In my opinion this attitude on the part of the people constitutes the best example of the results growing out of the last several years' endeavors on the part of the public utilities to create public good-will and understanding."

W. D. Johnston, manager, Mountain States Power Company, was elected president of the association, succeeding John G. Keegan of Cheyenne; H. L. Williams, Utah Power & Light Company, Evanston, first vice-president; H. E. Morgan, Northwestern Power Company, Thermopolis, second vice-president; George Oliver, Mountain States Power Company, Riverton, third vice-president; Barry Evans, Mountain States Telephone & Telegraph Company, Thermopolis, fourth vice-president. The program for the two days' session follows:

Friday, Aug. 17

"Legal Aspects of Public Utility Liability," G. R. Hagens, attorney, Casper, and Wilfred O'Leary, attorney, Cheyenne. Discussion led by R. E. Richardson, Lovell Gas Company.

"Uniformity in Reporting Valuations of Telephone, Gas and Electric Utility Properties." Discussion led by J. G. Keegan, Chyenne Light, Fuel & Power Company; C. L. Titus, Mountain States Telephone & Telegraph Company, Cheyenne; and J. H. Jacobbucci, Utah Power & Light Company, Green River.

"The Work of the Advisory Council, a Part of Our Public Relations Activity," Rufus Gentry, Public Service Company of Colorado.

"A Utility Man's Daily Dozen." General discussion of utility practices affecting public relations, led by W. D. Johnston, Mountain States Power Company, Casper; John R. Loiseau, Public Service Company of Colorado, Denver; and Thomas W. Hughes, Rawlins Light & Fuel Company, Rawlins.

"Public Utility Advertising," James J. Withrow, Sheridan County Electric Company, Sheridan; and Frank Jamison, Public Service Company of Colorado.

Election of officers.

Evening

Banquet and Safety First Demonstration.

Saturday, Aug. 18
New President Presiding

"Utility Operation Without Accidents." Frank Probst, Mountain States Telephone & Telegraph Company, Casper; M. H. Soule, Western Public Service Company, Laramie; Albert Park, New York Oil Company, Casper.

"Finding New Sources of Revenue"

(a) Telephone
L. J. Meyer, Mountain States Telephone & Telegraph Company, Cheyenne; R. M. Morris, Mountain States Telephone & Telegraph Company, Denver.

(b) Gas
T. E. Wood, New York Oil Company, Casper; T. F. Parks, Public Service Company of Colorado, Denver.

(c) Electric
L. W. Edwards, Mountain States Power Company, Casper; H. L. Williams, Utah Power & Light Company, Evanston.

General discussion.

California-Oregon Company Reduces Lighting Rates

Rate reductions representing an annual saving of approximately $90,000 to domestic and commercial lighting customers of The California Oregon Power Company will become effective Oct. 1, according to P. O. Crawford, vice-president and general manager. The new rates are applicable only to the urban communities in both California and Oregon served by the company. There will be no change in the combination rate for lighting, heating and cooking.

Under the new schedule the domestic lighting rate will be: for the first 50 kw.-hr. per month, 8 cents per kw.-hr., with the excess at 5 cents. This represents a considerable reduction under the old schedules, under which the top rate has been 10 cents per kw-hr. or higher. The monthly minimum has been set at $1. In Oregon this is an increase over the former minimum of 90 cents, but the quantity to which it is applicable is 12½ kw.-hr. as against the former amount of 7 kw.-hr.

Portland Valuation Hearing Postponed to Nov. 1.

Postponement of the formal hearing on concurrent investigations of the valuation of the properties of the Portland Electric Power Company by the City of Portland and by the Public Service Commission of Oregon was decided at on informal hearing Sept. 20. The date has been changed from Oct. 1 to Nov. 1, and both the city and the commission are expected to have completed their investigations by that date. Agreement was also reached that the case to be heard Nov. 1 is to include only the properties of the Portland Electric Power Company.

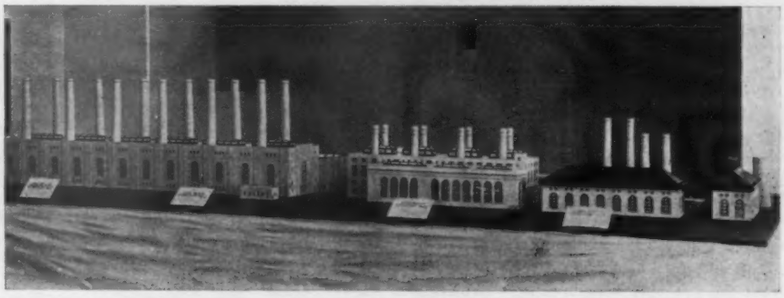
The rate investigation has been going forward since its inception last May. (Electrical West, June 1, 1928, p. 632.) Efforts of Kenneth G. Harlan, rate engineer, Tacoma, who has been retained at $48,000 by the city to conduct the municipality's case, to have the Northwestern Electric Company's properties also included in the investigation by the city, have been unsuccessful, since city officials present at the meeting of Sept. 20 indicated the city could not afford to pay him the additional $75,000 asked for this work. The commission proposes to undertake a valuation of the properties of the Northwestern Electric Company as soon as its present investigation of the Portland Electric Power Company is concluded.

Installation of Street-Lighting System Contemplated by Pullman, Wash.—The City of Pullman, Wash., is considering the immediate installation of a street lighting system, to include twelve blocks in the heart of the business district. The improvement has been petitioned for by the property owners in the district affected.

Tacoma Takes Steps Toward Construction of Second Unit of Project—Preliminary to letting of contracts for major construction on the second unit of the City of Tacoma's Cushman power project in about 60 days, Commissioner Ira S. Davisson has introduced before the City Council ordinances to authorize the issuance and sale of $3,850,000 of utility bonds and to authorize the construction. Another ordinance before the Council authorizes the purchase of $35,000 worth of transformer and other substation equipment to take care of the heavy power loads of the Hooker Electro-Chemical Company and the Tacoma Electro-Chemical Company plants.

Seattle Plans to Start Construction on Skagit Transmission Line—Although definite date has not been set, the Seattle City Light Department, headed by J. D. Ross, superintendent, plans to start construction on the Skagit transmission line from Gorge Creek to Seattle about Jan. 1. The line will be 120 miles long, three-phase, carrying 165 kv., and the completed cost, including right-of-way, clearing, pole line and equipment, will total approximately $1,800,000.

As It Will Appear When Completed



This model shows the Long Beach steam plant of the Southern California Edison Company as it will appear if the present program, including eight new 125,000-hp. units, is carried through to completion.

The two buildings on the right of the picture with the dark roofs constitute the original plant, which was built in 1912-13. This plant has six generators with a total capacity of 93,800 hp. The building in the center is known as No. 2 plant and was built during 1925-26-27. This plant houses three turbo-generators with a total capacity of 194,200 hp.

On the left is the plant intended to house the eight new units. One of these units is already in operation, and the others will be constructed as the need for them appears. Preliminary work is now under way on the second unit.

Northwest Electric Light & Power Association

Appointment of Committee Chairmen of Four Sections Is Almost Completed

THE business of organizing the four sections of the Northwest Electric Light & Power Association into working committees has been going forward under the section chairmen since their appointment at the twenty-first convention in Portland in June.

The first to complete organization is the Public Relations Section under W. H. Ude, The Washington Water Power Company, chairman, who reports the following committee chairmen: customer ownership— E. G. Jarvis, Portland Electric Power Company; employees' relations with the industry—E. C. Kiersted, Idaho Power Company; employees' relations with the public—Col. E. LeRoy Bourne, Utah Power & Light Com-

pany; public speaking—S. E. Skelley, Pacific Power & Light Company; advertising and publicity—John H. N. Adams, Mountain States Power Company; co-operation with educational institutions—W. P. Strandborg, Portland Electric Power Company; relations with financial institutions—W. H. Lines, Portland Electric Power Company; women's committee—Mrs. Nell Laws, Puget Sound Power & Light Company.

In addition to these committee chairmen, the state vice-presidents with the section chairmen make up the executive committee of the section. The state vice-presidents are: R. B. King, Idaho Power Company, who has been named vice-chairman of the section; W. B. McDonald, Mountain States Power Company; G. L. Myers, Pacific Power & Light Company; P. M. Parry, Utah Power & Light Company; and N. W. Brockett, Puget Sound Power & Light Company.

The second to announce a complete organization is the Accounting Section under its chairman, A. E. Janssen, Idaho Power Company. Committee chairmen are as follows; purchasing and storeroom—R. H. Jones, Utah Power & Light Company; customers' records — B. H. Parkinson, Pacific Power & Light Company; classification of accounts—W. F. Miller, The Washington Water Power Company; fixed capital records—L. E. Hinman, Portland Electric Power Company; statistics—B. G. Gadeholt, Northwestern Electric Company; general records—O. W. Bennett, Puget Sound Power & Light Company; research—D. F. McCurrach, Northwestern Electric Company.

M. J. Wilkinson, Pacific Power & Light Company, has been appointed vice-chairman of the section, and an additional member-at-large of the executive committee is F. W. Brownell, Puget Sound Power & Light Company, last year's chairman.

D. W. Proebstel, Portland Electric Power Company, chairman of the Engineering Section, has likewise completed his organization, announcing committee chairmen as follows: electrical apparatus—E. F. Pearson, Northwestern Electric Company; accident prevention—J. B. Fisken, The Washington Water Power Company; hydraulic power—E. H. Collins, The Washington Water Power Company; inductive co-ordination—G. E. Quinan, Puget Sound Power & Light Company; meter—A. H. Kruel, Portland Electric Power company; prime movers—C. C. Simeral, Portland Electric Power Company; underground systems—C. H. Hoge, Puget Sound Power & Light Company; overhead systems—T. A. Purton, Idaho Power Company; co-operation with regulatory bodies—Z. E. Merrill, Mountain States Power Company.

The following members-at-large act with the above on the section executive committee: H. H. Schoolfield, Pacific Power & Light Company; J. A. Hale, Utah Power & Light Company; W. S. Hill, Grays Harbor Railway & Light Company; J. B. Brokaw, Eastern Oregon Light & Power Company; M. V. Watson, Peoples West Coast Hydro-Electric Corporation; O. L. LeFever, Northwestern Electric Company; and J. E. Yates, Pacific Power & Light Company. E. F. Pearson has been chosen vice-chairman of the section.

In the Commercial Section, under Lewis A. Lewis, The Washington Water Power Company, the organization of committees is going forward, but announcement is withheld until all acceptances have been received. The following will head the bureaus for the current association year: power bureau—E. E. Scofield, The Washington Water Power Company; lighting bureau—Fred Zaugg, Northwestern Electric Company; and merchandising bureau—V. H. Moon, Pacific Power & Light Company.

Pacific Coast Electrical Association

Engineering Section Urged to Study Economic and Commercial Problems

URGING that all members of the Engineering Section extend their interests and activities outside the bounds of purely technical problems to aid the utilities in the solution of some of their major commercial problems, P. M. Downing, vice-president in charge of construction and operation for the Pacific Gas and Electric Company and president of the Pacific Coast Electrical Association, uttered a challenge to the members of the P.C.E.A. Engineering Section at its recent San Francisco conclave. Mr. Downing was the principal speaker at the general luncheon meeting held at the Clift Hotel, Sept. 20, incident to the three-day technical sessions. The engineering burden is growing rather than diminishing, in the opinion of the speaker, who pointed out that analysis of the cost of electrical energy as delivered to the ultimate consumer shows that the major contributing items are development and construction costs, together with carrying charges. Mr. Downing stated that the continually lowering cost of electrical energy, so far as the consumer is concerned, has contributed to the growth of the industry and that the present uphill trend in development costs furnishes the utility engineer with the subject of his most important study.

Touching briefly upon the subject of saturation of the electrical market, the speaker cited several cases in support of his contention that the electrical market is far from saturated. In his opinion, an energetic and constructive program of development and education in utilization will result in increased power sales to the mutual benefit of consumer and power company.

Detailed activities of the various well attended committee meetings are covered in the following reports submitted by the committee chairmen:

Accident Prevention Committee

F. S. THOMAS
Coast Counties Gas & Electric Company, Chairman.

The plan of holding joint sessions with the various committees was so well received last year that it was decided to continue them this year. In addition, the committee plans to study and report upon the following subjects as its year's work:

1. Compilation of accident statistics and uniform reports, based upon fundamental causes.
2. Accident costs vs. cost of prevention.
3. First-aid training — suggesting one common manual rather than two or three as at present used.
4. Radio aerial hazards.
5. First-aid training of firemen and policemen.
6. Foreman training and conferences.
7. Surface hazards at underground manholes.
8. Hazards to public on main traveled streets and highways in vicinity of line construction work.

Electrical Apparatus Committee

H. T. SUTCLIFFE
Pacific Gas and Electric Company, Chairman.

About 80 members and visitors were present at the meetings of the apparatus committee at which initial progress was reported on seven studies being carried on by special subcommittees and the work for the remainder of the year was lined up.

The work on lightning arresters will include as well a study of the territory in which electrical storms are of most frequent occurrence and of the damage actually caused by lightning as related to the economics of lightning arrester installation. Under relays, consideration also will be given to the associated elements in the relay circuits such as pallet switches, control wiring, auxiliary relays and other items. The study of transformers and feeder regulators will include methods used in regulating long rural circuits and the economics of rebuilding transformers of older types in order to adapt them to further use under more modern conditions.

The subcommittee on utilization equipment is endeavoring to arrive at a scale of values covering starting currents of induction motors which will be mutually acceptable to utilities and manufacturers. The subject of automatic substations will include also supervisory control and semi-automatic operation of substation equipment. Studies of switch gear will extend the work carried out last year on oil circuit breakers and will include disconnecting switches and fuses. Under the subject heading of "Operating Methods and Routine" consideration will be given to means for increasing the efficiency of operation of stations where operators are regularly in attendance.

Hydraulic Power Committee

H. K. FOX
San Joaquin Light & Power Corporation, Chairman.

The use of concrete in hydraulic structures, by F. J. Mills, chairman of the subcommittee, was the first subject to be discussed. Since the general subject of concrete is too broad to be handled properly by the hydraulic power committee, the investigation will be limited to the uses of concrete in strictly hydraulic structures and particular attention will be given to permeability and durability of concrete. The strength of concrete already is definitely under engineering control.

Research in hydro-electric development, with E. N. Murphy as chairman of the subcommittee, is a new subject. Judging from the discussion at the San Francisco meeting, the committee will have no trouble in

obtaining a record of new developments from the Pacific Coast members.

The subcommittee studying hydraulic plant operating problems, with L. J. Roberts as chairman, is expected to be a clearing house for operating problems and it is hoped that the result of the work will be a closer co-ordination between the operating and the construction departments.

Continuing the study of mechanical reliability of hydro-electric plants, E. A. Crellin, chairman of the subcommittee, urged that member companies keep operating records in such a way that they may be assembled quickly at the end of each year for the purposes of this report. This work is being carried on in conjunction with the N.E.L.A. and has been under way for the past five or six years.

Flow-line conduits is a new subject and J. W. Jourdan is chairman of the subcommittee. As decided upon by discussion, the present study will be limited to ditches, canals and bench flumes.

Continuing last year's work on penstock painting, C. M. Mardel is chairman of a subcommittee to study protective coatings for hydraulic structures. A preliminary report was given and a questionnaire submitted which will be used in reporting experience with various protective coatings.

Walter Dreyer, chairman of the penstock subcommittee, reviewed past reports upon penstocks and stated that the purpose of the present report is to revise former reports to include new data and new developments in design, manufacture and construction.

In addition to the seven subjects listed, two papers will be prepared during the coming year, one by G. A. Hunt on hydraulic plant operating troubles caused by low temperatures, and another by R. F. Krafft dealing with the silting of reservoirs.

Inductive Co-ordination Committee

E. Y. PORTER

The Southern Sierras Power Company, Chairman.

Unusual interest was shown in the first meeting of this committee, about 25 members and visitors being in attendance. J. O'R. Coleman, from N.E.L.A. headquarters, was present and reviewed the report of the national inductive co-ordination committee meeting at Louisville, Ky., last March. Stress was laid on the proposed Rule 902-F submitted for inclusion in the National Code, which if adopted would practically prohibit service from circuits employing a common primary and secondary neutral. Sufficient opposition developed against this rule to prevent its adoption at this time.

It was pointed out that new developments in automatic train control are of such nature that at least one system appears to be practically proof against outside inductive interference. Mention was made of the recent hearings by the Radio Commission at which request was made by representatives of the power companies for assignment of two bands for emergency radio transmission, one between 2,000 and 2,250 kilocycles and one between 4,000 and 4,500 kilocycles. The commission has not taken definite action on this matter.

In a joint session with the overhead systems committee a progress report of the joint committee on the study of the common neutral problem showed that the study had reached the final stage and detail tests were being made on selected areas. However, the results were not in shape for drawing any conclusions or for general discussion. It is hoped that the work will be completed before the January meeting of the committee.

A short progress report from the subcommittee on power company communication systems was read and a brief outline given of the work of the radio co-ordination and complaints subcommittee. Adjournment was taken at 3 p.m. to enable members to attend a meeting of the American Railway Association, Telegraph and telephone Section, at which three very interesting papers on co-ordination matters were presented, one of these being by P. M. Downing, president of the P.C.E.A.

Meter Committee

L. L. CONRAD

Southern California Edison Company, Chairman.

The preparatory organization work having been accomplished through correspondence during the summer, the San Francisco meetings were devoted to the presentation of reports by subcommittee chairmen.

Through the subcommittee on education of metermen three short courses for metermen are contemplated for 1929. These courses are to be conducted at the University of California at Berkeley, the California Institute of Technology at Pasadena, and at the University of Arizona at Tucson. The 1928 courses at the above institutions showed 89 registrants.

The subcommittee on new developments presented for inspection the recently developed meters and metering appurtenances, the manufacturers' representatives describing their own products and conducting the discussion on them.

A very complete report on clocks and timing devices was submitted last year, and hence little was offered at this meeting. However, as developments are made on the subject investigations will be conducted and the results reported at later meetings.

Accurate time by frequency control was discussed following the description of a method employing a tuning fork as a standard, and many interesting features were disclosed.

The study of meter statistics embodies many details of interest to the meter departments. The subcommittee reported that investigations are to be continued in the future with reports at the close of the year.

A report by the special metering subcommittee included practical applications of various methods of remote metering and demand metering and the subcommittee on testing facilities reported late developments and results of recent investigations. Tests conducted to determine the losses of potential coils were reported upon by the special tests and investigations subcommittee.

A new subcommittee to study uniform regulations for metering practices was appointed this year to investigate existing ordinances and orders relating to metering practices. The submitted report contained interesting data which indicates a valuable report at some future date.

Overhead Systems Committee

R. G. BOYLES

Southern California Edison Company, Chairman.

The joint subcommittee studying the question of a common primary and secondary neutral met jointly with the overhead systems committee and the inductive co-ordination committee, presenting a short progress report of the work being done by the representatives of the N.E.L.A. and the American Bell Telephone Company. This report covered the investigation now being carried on in certain California areas where this work is under way and indicated that the field investigation will be completed within a short time.

Study of the problems incident to transformer loading is to be continued this year by a subcommittee and is to include methods of obtaining loads on transformers. A special instrument, designed at one of the power company laboratories especially for work of this character was on exhibition and appears to have commendable possibilities.

Other studies that will be carried on by subcommittees during the coming year include the following:

1. Pole line structures and devices.
2. Pole line construction tools—a continuation of the work undertaken last year.
3. Methods of securing satisfactory grounds.
4. Corrosion of metal in line construction.
5. Joint pole practice and construction rules.

Prime Movers Committee

F. R. KNIGHT

Las Angeles Gas and Electric Corporation, Chairman.

Relative merits of strip and circular charts and the various methods of filing these charts were discussed. An expressed need of accurate methods of measuring small differences of temperature and pressure brought forth a description of certain instruments that had been developed by one of the instrument manufacturing companies for these services and a further description of the instruments developed for and installed by the Southern California Edison Company at the Long Beach steam plant for automatic frequency control.

R. S. Twogood, of the Southern Pacific Company, requestetd that the prime movers committee make a study of the minimum number and desirable kinds of instruments required for good plant operation.

Turbine generator equipment was discussed by C. W. Wiggins, chairman of that subcommittee, and this led into a discussion of the advisability of paralleling direct-driven house generators for the purpose of transferring load.

Some interesting papers and reports are expected for the January meeting from August Sattler's subcommittee on boiler water and condensing water. The relative merits of different methods of treating boiler feed water to maintain proper ratios aroused considerable discussion. Some interesting papers on hydrogen-ion instruments and hydrogen-ion control are expected to come out of studies of these subjects. Caustic embrittlement is a subject still open for further study as shown by discussion at the San Francisco meeting.

Heat-balance studies are to be continued by that subcommittee under the direction of L. J. Kraps, chairman. The aim will be to bring the studies up to date and to consider some of the different methods used for tabulating and computing readings obtained in the various plants.

C. H. Delany, chairman of the subcommittee on boilers, furnaces and accessories, outlined the proposed work for the year in which one of the most interesting reports is expected to deal with the method employed by the Pacific Gas and Electric Company for keeping stand-by boilers hot with small heat loss. Also this committee expects to report on the continuous blowdown system used by the San Diego Consolidated Gas & Electric Company, and the method of water-wall construction used by the Pasadena municipal plant.

In the report of the condensing equipment subcommittee prepared by R. F. Leefeld was given a description of rubber packing now used by the Los Angeles Gas and Electric Corporation at the Seal Beach plant. A more complete report of this subject will be prepared later.

Electrolytic protection for condensers also came in for its share of discussion.

Investigations which are to be the subject of printed reports for the 1929 P.C.E.A. convention issue of ELECTRICAL WEST should be initiated at once, if not already under way, in order to insure their timely completion.

Underground Systems Committee

K. B. AYRES

San Diego Consolidated Gas & Electric Co., Chairman.

A total of thirteen subjects was presented at the San Francisco meetings, most of which created considerable interest and resulted in highly satisfactory discussion. Specifically, the following subjects were presented and discussed:

1. Provision of vault space for streetlight transformers.—Paul E. Chapman, with a paper by George Brand.
2. Subdivision underground specifications and methods of installation.—C. C. Biggs.
3. Reliability of high-voltage cable in operation.—E. R. Stauffacher.
4. Identification of cables in manholes and vaults.—Paul Suransky.
5. Training of underground force (mechanical, electrical, safety, etc.), splicers' equipment (tools and devices), underground equipment, miscellaneous apparatus, safety devices.—R. P. Lutzi.
6. Methods of caring for high-tension cables while enlarging manholes and building new manholes.—C. H. Jenkins.
7. Automatic vs. manual transfer of load between circuits.—H. H. Buell.
8. Underground work during daylight hours. Objections to cable pulling and cable splicing at times of congested traffic on streets vs. such work at night when streets are clear.—E. R. Northmore.
9. Methods of installing small transformers to prevent submersion.—S. J. Bowman.
10. Engineering aspects of the use of lower-loss transformers in underground systems instead of ventilating transformer manholes and vaults.—R. R. Cowles.
11. Improvement of underground disconnecting switches and reduction of operating hazard.—H. G. Keesling.
12. Standardization of cable reels.—G. H. Hagar.
13. Ventilation of manholes during work and protection of open manholes in streets with heavy traffic.—D. J. Kelly.

These subjects will be developed further and presented at future meetings in completed form.

Executive Committee Will Meet—The executive committee, P.C.E.A., will meet in San Francisco Saturday morning, Oct. 20, at 10 o'clock, in the office of the secretary, 447 Sutter St.

Purchasing and Stores Section Meeting—A meeting of the Purchasing and Stores Section, P.C.E.A., will be held in San Francisco Nov. 22-23.

Personals

Superintends Distribution for Utah Company

ADVANCED from the position of assistant to the chief engineer of the Utah Power & Light Company, Salt Lake City, **Charles R. Higson** now is

CHARLES R. HIGSON

superintendent of distribution for that company. In this new capacity he will have charge of distribution operations covering the company's entire system, his chief responsibilities being standardization of operation and construction.

Mr. Higson's promotion comes after many years of service with the Utah Power & Light Company and its predecessors. After receiving his early education in the grammar and high schools of Salt Lake City, he was graduated in electrical engineering from the University of Wisconsin. The following two years he spent with the General Electric Company and then returned to theh University of Wisconsin, where he was instructor in electrical engineering for four years.

In 1912 he returned to Utah and was employed by the Utah Light & Traction Company. A year later he joined the Utah Power & Light Company as a substation operator and soon was advanced to the position of assistant engineer. A promotion made him distribution engineer, and through another he became assistant to the chief engineer, the post he recently left to take over his new responsibilities.

Mr. Higson takes a prominent part in the activities of a number of the engineering organizations in Salt Lake City and has served a term as chairman of the Utah Section of the American Institute of Electrical Engineers.

A. H. Scherrer, formerly connected with the Latourette-Fical Company, Sacramento, Calif., and for the past year electrical instructor in the Fresno Technical School, will continue to serve in that capacity for the coming year.

A. H. Nicoll, sales manager, Graybar Electric Company, San Francisco, returned a short time ago from a business trip to the East. While there he visited the factory and also attended a conference of sales managers at Absecon, N. J., on the new merchandising plans of the company.

Raymond Wilcox, formerly steam power engineer in the department of engineering design, Southern California Edison Company, has been made mechanical engineer of the steam generation department of that company. In this new capacity he will report to Frank G. Philo, superintendent of the steam generation department, and will be stationed at the Long Beach steam plant, Long Beach, Calif.

Clark Baker, National Lamp Works, Oakland, Calif., attended the twenty-second annual convention of the Illuminating Engineering Society at Toronto, Sept. 17-20, and also the International Congress on Illumination held at Saranac, N. Y., Sept. 22-23.

M. T. Crawford, superintendent of distribution, central district, Puget Sound Power & Light Company, Seattle, recently returned from a month's trip to Honolulu, where he was called by the Hawaiian Electric Company to consult with its engineers on certain high-voltage cable problems.

W. H. Ude, director of public relations, The Washington Water Power Company, Spokane, attended a meeting of the executive committee of the Public Relations Section of the N.E.L.A. at Chicago on Sept. 12.

P. L. Miles, manager range department, and **M. H. Beekman,** manager appliance department, respectively, Edison Electric Appliance Company, Inc., Chicago, have been making a month's tour of the Pacific Coast.

W. Tardif, formerly with the J. G. Pomeroy Company, San Francisco, has resigned to enter the sales department of the Pacific States Electric Company.

W. B. Foshay, president, W. B. Foshay Company, who recently spent some time on the West Coast in an inspection tour of the company's properties in that territory, returned to Minneapolis in the early part of September to attend a banquet celebrating the eleventh anniversary of the founding of the Foshay company.

Dr. R. A. Millikan, director of the Norman Bridge Laboratory of Physics, and chairman of the executive council, California Institute of Technology, Pasadena, Calif., recently was presented by the Society of Chemical Research with its Messel Medal in honor of his work on the structure and relations of atoms. The presentation was made at the society's annual meeting in New York, and in response Dr. Millikan delivered an address on "Available Snergy."

D. C. Henny, consulting hydraulic engineer, Portland, Ore., has been appointed to represent the Northwest on the Committee on National Water Power Policies of the U. S. Chamber of Commerce.

John Clark, Pacific Coast sales promotional manager, merchandising department, Westinghouse Electric & Manufacturing Company, San Francisco, spoke on "The History of Electric Merchandising" at a recent meeting of the San Diego Electric Club.

Paul D. Howse, president, Claude Neon Electrical Products, Inc., formerly the Electrical Products Corporation, Los Angeles, recently left for a two months' business trip to the Neon laboratories in Paris and Vienna.

Reed Christiansen, formerly connected with the Pacific Electric Railway, Los Angeles, has resigned to become general manager of the Harbor Belt Line Railway, San Pedro.

New Member of Directorate of Edison Company

THE position on the board of directors of the Southern California Edison Company, Los Angeles, made vacant by the recent resignation of W. A. Brackenridge, now is occupied by **Ben R. Meyer,** who was elected by the board to fill the vacancy.

Mr. Meyer, a native of San Francisco, has resided in Los Angeles for the past 30 years and has been closely identified with the financial history of that city. In 1908 he became associated with the late Kaspare Cohn and in 1914 assisted Mr. Cohn in the organization of the Union Bank and Trust Company. Mr. Meyer has been president of that bank since 1919. He was for fifteen

BEN R. MEYER

years a director of the San Joaquin Light & Power Corporation and its associated company, the Midland Counties Public Service Corporation. For the past thirteen years he has been a director and vice-president of the Southern California Gas Company. He is on the executive committee of the Los Angeles Clearing House Association, is treasurer of the Community Chest, a director of the California Institute Associates, and also a director of the Los Angeles Chamber of Commerce.

Mr. Meyer's banking and public utility experience, combined with an intimate knowledge of business and civic affairs in southern California, should make him a valuable member of the Edison company's directorate.

Contractors, Dealers and Inspectors

New Code Reviewed at International Inspectors' Denver Convention

THE twenty-fourth annual convention, Western section, International Association of Electrical Inspectors, was held in Denver, Sept. 10-12. Two hundred and forty members of the association registered for the business sessions. These, together with approximately 100 wives and guests of delegates, brought the total registration up to 350.

It is declared that no meeting previously held by the association has evidenced more of harmony, constructive activity or united support of the inspectors' program than the one just concluded. Business sessions were held each morning and afternoon, and these were unusually well attended. It is evident to the many representatives of all branches of the industry who attended the convention that this organization, with its freedom from suspicion of commercial bias, is a great asset to the industry as a whole, and one meriting the industry's united support.

With but very few exceptions, the business program was composed of addresses regarding changes embodied in the 1928 National Electrical Code. Addresses were given on every article in the code, and discussion of the subjects indicated that there is general satisfaction with the nature of the changes and the manner in which this work has been handled. It is seen, however, that there is need for even further development. The report on article No. 9, which concerns grounding, was received with enthusiasm and all 1928 code requirements on this subject were given general approval, and even more co-operation with waterworks engineers was urged as a means of assuring full compliance with code requirements for safe grounding connections to water systems.

The keynote of the convention seemed to be that the 1928 National Electrical Code is a great step in advance, and more thoroughly covers the needs of the inspectors and of the industry than ever before. More progress is needed, and many of the proposed improvements not included in the 1928 issue should be worked up for inclusion in the next edition. What the consumer needs and deserves is better electrical construction, greater safety, additional circuits, more outlets, better grounding and mechanical protection of wiring. As F. F. McCammon, of the Public Service Company of Colorado, said in his address, Denver and Colorado are definitely in favor of the best construction, and of all-metal ordinances wherere conditions warrant as in Denver. Other talks which stressed the desire of the public and of the industry for better and more adequate wiring, and brought out the necessity for the code to develop in these respects, were given by George H. Parker, manager of the Kentucky Actuarial Bureau, and by W. A. J. Guscott, Denver Electragist.

Delegates to this convention were most enthusiastic over the reception accorded them upon their arrival in Denver. This was taken as expressive of the thoroughness with which the inspectors are incorporated as a vital part of the electrical industry. The entertainment program included a bridge party, fashion review and automobile drives for the ladies of the convention. The annual banquet was held on Monday night. Tuesday noon all delegates were given a luncheon under the auspices of the Electrical League of Colorado. A fire department exhibition, including a novelty water polo event, regimental by the Denver Highlander Boys and organization, and aerial maneuvers by the Flying Squadron of Colorado, featured the afternoon amusement for that day. Wednesday night's program consisted of an illuminated fire run, vaudeville and boxing and wrestling tournaments at the City Audi-

The Road to Fresno—from all parts of California Electragists will

A FOOT or on horseback, by air or by sea (if the San Joaquin river is still navigable), but any way to get there. That is the determination of all California Electragists, and of contractors who would know more about what the Electragists do for their business improvement. On to Fresno, where the meetings this year will be shortened to one day's session, for contractors alone, on Saturday, Oct. 27,

The artist has taken liberties with notables in the Electragist organization in trying to portray the pilgrimage to Fresno. Earl Browne, manager, San Francisco Contractors and Dealers Association, takes to the slow but sure tractor, on which there is room for one more. President Frank McGinley, of Wilmington, seems to have dropped a vice-president — Eddie Martin, who, nearing Fresno is in a hurry to get down to earth on contractor problems. Bob Booth, of the Los Angeles Estimators' Section, will get there, even if he has to come on crutches. National President Clyde Chamblin represents the dry party on an ancient and honorable beast of burden. Vic Lemoge will come, under full head of steam as usual, while the Geisbush family, including Mrs. and Tippy, may put their faith in the old Dodge. Kelly Courtright, the host, overlooks the scene of action from a high vantage, but hardly an appropriate one, in a gas balloon, for so high powered an electrical merchandiser.

torium. A "chuck wagon" feed and automobile trip through Denver Mountain Parks to Echo Lake on Thursday concluded the entertainment program.

William A. Haig of Milwaukee was elected president of the association for the coming year. L. A. Barley of Denver, first vice-president, and A. G. Hall of Toronto, second vice-president. William S. Boyd, Chicago, was re-elected secretary-treasurer.

The Keystone Electric Company is a newly opened electrical contracting store at 509 East Colorado Blvd., Glendale, Calif.

Queen City Electric Company, Denver, was awarded the contract to wire the Associated Realty Corporation model display home, which is to be a Red Seal installation.

E. C. McGrew, former journeyman for the **Silver State Electric Company,** Denver, will succeed L. H. Hall as clerk in the city electrical department of that city.

Ne Page-McKenny Company, electrical engineers and contractors, Seattle, will erect a two-story plant and warehouse, 120 x 120 ft. in size, at Sixth Ave. South and Dearborn, Seattle, estimated to cost $40,000. It will be ready for occupancy in the summer.

California Inspectors Postpone Convention

Inability to obtain speakers, as well as other difficulties, has caused the executive committee of the California Association of Electrical Inspectors to postpone its contemplated convention until next year. The convention was to have been held in Sacramento Oct. 25, 26 and 27.

Reasons given for the postponement were that it is difficult for inspectors to obtain permission to attend two conventions in a year (a convention was held in March at Santa Barbara); that the 1928 edition of the National Electrical Code just issued has not had a chance to be studied or tested by field experience; and that speakers are not available now. The Northwest Association of Electrical Inspectors has changed its convention date to next September, and has promises of many national speakers for that meeting, all of whom Claude Mitchell, secretary of the California association, hopes to be able to persuade to come to the latter's convention next fall.

Full details of the changes in plan will be sent to all members by the secretary.

The Stead Electric Shop at 300 North Citrus Ave., Covina, Calif., is a recently opened store. **Sam Stead,** formerly with **H. H. Walker Company,** of Los Angeles, is the proprietor. This store is stocked with a complete line of appliances of radio and conducts a general electrical contracting business as well.

The Motor and Machinists Supply Company, specialists in motor repair and installation, have added another floor of space to their shop to accommodate the service department. This department is for the service work on electrical household appliances which has been taken over from the **Woodill Hulse Company,** now out of business. The Motor and Machinists Supply Company now occupy 230 to 236 South San Pedro St., Los Angeles.

Sawyer & West Electric Company, formerly located at 1853½ West Adams, has moved into a new store at 4759 West Adams, Los Angeles. A complete line of electrical appliances is being stocked in addition to the contracting business.

The Alert Electric Company has recently been opened at 1011 Los Angeles St., Los Angeles, by William Odenthal. The shop will specialize in general electrical contracting and industrial installations.

make their trek to discuss intimate business problems at the state convention

SATURDAY, Oct. 27, may be just another day to some, it may be football day for the supremacy of something or other, but to California Electragists it will be a day of serious import. Not even the presidential election a few days later can mean so much in the lives of electrical contractors.

All frills and fuss are to be eliminated so that the entire time can be taken up with the important business at hand. There will be no entertainment features, no women's entertainment, no banquet. Serious matters relating to membership drives, to changes in the constitution of the A.E.I., to dues, to the educational activities of the association and to trade development work will come up. If Saturday, all day and evening, is not enough to finish the work sessions may be continued Sunday morning.

The California Electragists wish to keep the expense to the barest minimum in order that every contractor in California may come. Registration fee will be very nominal; hotel rates have been obtained at Hotel Fresno, in which the convention will be held.

Reservation information and any other details concerning the convention may be obtained by direct communication with Earl Browne, secretary, Northern Division, 522 Call Building, San Francisco, or C. J. Geisbush, manager, California Electragists, 610 Cotton Exchange Bldg., Los Angeles. Bulletins will be sent out giving details.

Meetings

Coming Events

California Electragists—State convention at Hotel Fresno, Fresno, Calif., Oct. 28, 1928.

California Association of Electrical Inspectors—Annual convention in Sacramento, Calif., postponed. See p. 241.

Electrical Trade Show—In Grand Central Palace, New York City, Oct. 17-19, 1928.

National Electrical Manufacturers Association—Fall meeting at Briarcliff Lodge, Briarcliff, N. Y., during week of Oct. 29, 1928.

National Electrical Wholesalers Association — Pacific Division — Quarterly meeting at Hotel Del Monte, Del Monte, Calif., Oct. 17-19, 1928.

Pacific Coast Electrical Association—Meeting of executive committee in San Francisco at 10 a.m. Oct. 20, 1928, in the office of the secretary.

Engineering Section—Conclave in Los Angeles, Jan. 16-18, 1929.

Purchasing and Stores Section—Meeting in San Francisco, Nov. 22-23, 1928.

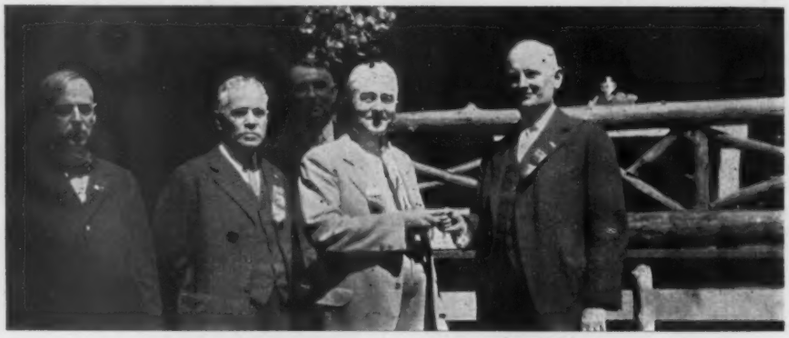
Service Pin Presentation Feature of Picnic

Six hundred people attended the seventeenth annual picnic of the employees of the Coast Counties Gas & Electric Company held at Big Trees near Santa Cruz, Calif.

A feature of the picnic was the presentation of new service pins to employees. These pins are made of solid gold and bear on their face the following designations: "Five Years Service," with one star; "Ten Years Service," with two stars; "Fifteen Years Service," with three stars; "Twenty Years Service," with four stars; "Twenty-five Years Service" with one diamond; Thirty Years Service," with two diamonds; "Thirty-five Years Service," with three diamonds. Three employees, George Dunn, Arthur Gourdier and Oscar Ewald, received 30-year pins.

R. L. Cardiff, formerly manager of the company, received a 35-year pin for 37 years' continuous service. On July 1 Mr. Cardiff gave up his activities in the electrical industry to become president of the Beach Hotel Company, operating the Casa del Rey and the Santa Cruz Seaside Company. A. E. Strong, formerly superintendent of the Coast Counties company's Coast Division, has succeeded Mr. Cardiff as manager of that company, with headquarters in Santa Cruz.

Electrical Wholesalers to Meet—Oct. 17, 18 and 19 are the dates set for the quarterly meeting of the Pacific Division of the National Electrical Wholesalers Association, formerly the Electrical Supply Jobbers Association. The meeting will be held at Hotel Del Monte, Del Monte, Calif.



Presentation of service pins to employees at the seventeenth annual picnic of the employees of the Coast Counties Gas & Electric Company, Santa Cruz, Calif., was made by S. Waldo Coleman, president of the company. He is shown at the extreme right presenting a 35-year pin to R. L. Cardiff. The others in the picture received 30-year service pins. They are, left to right, George Dunn, Oscar Ewald and Arthur Gourdier.

Orange Belt Electric Club Makes Its Bow

With a membership made up from Fontana, Rialto, San Bernardino, Redlands, Colton, Riverside and other nearby places, the Orange Belt Electric Club is one of the newest groups to enter the ranks of organizations of the electrical industry in California. There were 65 present at the organization meeting, which was held recently in the Fontana Inn, Fontana, Calif. Meetings are held on the third Friday of each month, and there are no dues or initiation fees.

The purpose of the club is set forth as follows: "The club shall be a voluntary association for the purposes of promoting mutual acquaintanceship among its members and interchange of ideas on matters relating to the electrical industry in all its phases." The membership consists of "those engaged in some profession, business or calling connected with the electrical industry, including the generation, transmission and distribution of electric energy, the manufacture, jobbing or retailing of electrical machinery, fixtures, apparatus and merchandise."

Officers elected for the ensuing year are: president—James H. Paige, owner, Paige Electric Company, San Bernardino; vice-president—Robert L. Bouldon, superintendent, City Light Department, Riverside; secretary-treasurer—Leon S. Heseman, commercial representative, The Southern Sierras Power Company, Riverside.

Los Angeles Electric Club Names Committee Heads

Organization for the ensuing year has been completed by the Los Angeles Electric Club, which announces the appointment of the following committee chairmen:

Attendance—E. M. Ellis, General Electric Company; auditing and finance—E. N. Simmons, Los Angeles Gas & Electric Corporation; civic and interclub relations—B. G. Wright, Southern California Telephone Company; fellowship—J. M. Morris, Westinghouse Electric & Manufacturing Company; membership—B. S. Manuel, Illinois Electric Company; personnel—W. A. Knost, Pacific Mutual Life Insurance Company; program and entertainment—A. E. Hitchner, Westinghouse Electric & Manufacturing Company; public policy—Fred Lewis, Southern California Edison Company; sports and athletics—Joseph Sines, Chicago-Jefferson Fuse & Electric Company; stunts—W. A. Krueger, Pacific States Electric Company; visiting and relief—J. L. Kline, Western Light & Fixture Company.

Big Creek Inspection Tour Made by Newspaper Men

Newspaper men of southern and central California, accompanied by officials of the Southern California Edison Company, recently completed a three-day inspection tour over the entire Big Creek-San Joaquin River project where the Edison company has built a chain of power houses with a total capacity of 453,200 hp.

R. H. Ballard, president of the company, and F. B. Lewis, vice-president and assistant general manager, acted as hosts. The entire group stayed at the Huntington Lake Lodge on the shores of Huntington Lake and made automobile trips to the various parts of the project. The evenings were spent in jovial informal meetings in the lobby of the lodge.

Los Angeles Engineers' Club Announces Dinner Meeting Program—Televox equipment will be demonstrated and discussed by representatives of the Westinghouse Electric & Manufacturing Company at a dinner meeting of the Los Angeles Engineers' Club to be held Oct. 18 at the club rooms, 833 South Spring St. A second feature of the program will be a description of the Southern California Edison Company's Long Beach No. 3 steam plant by F. G. Philo, superintendent of steam generation.

Oakland Electric Club Resumes Meetings—Following the summer period of inactivity, the Oakland Electric Club has resumed its regular Monday meetings, which are held in the West Room of the Hotel Oakland at 12:15 noon.

Manufacturer & Distributor

Representatives Announced by Lamp Company

The following arrangements for representation in the Western territory have been announced by the **Kulp Theft-Proof Lamp Company,** 330 South Wells St., Chicago:

Stephen Smith & Company, 12 Stewart St., San Francisco, composed of Stephen Smith and O. H. Davison, will be in charge of the northern California territory. The southern California territory will be covered by The Sierra Electric Company, 445 South San Pedro St., Los Angeles, headed by H. H. Van Luven. That company will also handle the Oregon territory, with offices at 53 Fourth St., Portland, in charge of Ray Flatland, and the Washington territory, with headquarters at 71 Columbia St., Seattle, in charge of R. D. Robinson. The Jennings McCollom Company, 221 South West Temple St., Salt Lake City, will represent the company in Utah, and W. W. Stone will cover the Colorado territory, working out of Denver.

Change in Seattle Firm—Gillette & McLaren, Inc., is the new name of the organization formerly known as Strimple & Gillette, Inc., Mr. Strimple's interests having been purchased by Messrs. Gillette and McLaren. The firm represents in Washington and Oregon the following manufacturers: Circle F Manufacturing Company, the A-C Dayton Company, Getz Power Washer Company, Wilmington Fibre Specialty Company, M. S. Wright Company, and the Matchless Electric Company's radio lines.

Manufacturers' Agent Opens Offices—Offices have been opened at 53 Fourth St., Portland, by John M. Cavanaugh, manufacturers' representative. At the present time Mr. Cavanaugh is representing **Electrical Engineers Equipment Company,** Melrose Park, Ill., in the states of Oregon and Washington.

Rocky Mountain Representative Appointed—Announcement has been made by the **Ideal Commutator Dresser Company,** Sycamore, Ill., that it is now represented in the Rocky Mountain district by the Industrial Supply Company, 121-125 Motor Ave., Salt Lake City.

Stove Company Offers Authorized Dealer Contracts—The Standard Electric Stove Company, 1718-1720 North Twelfth St., Toledo, is offering its dealers authorized dealer contracts assigning to the dealers specific territories and furnishing them with sales helps, consisting of window trims, literature, advertising layouts and circularization of consumer prospects. These contracts are made through its authorized distributors where the Standard company has distributors and direct by the factory where there is no distributor representation.

To Act as Representative in the Northwest—C. R. Dedrick, 346 Sherlock Bldg., Portland, recently has been appointed representative in Oregon, Washington and western Montana for the **Metropolitan Devices Corporation,** Brooklyn, N. Y., and the **Utility Fittings Company,** Philadelphia.

Manufacture Line of Electric Heaters—A plant for the manufacture of air heaters has been established at 26th and Adeline Sts., Oakland, Calif., by the **Weir Electric Appliance Company.** W. W. Weir is president; H. A. Starks is secretary and treasurer, and R. S. Prussia is in charge of sales.

Named as Pacific Coast Representative—James J. Noble Company, with offices in Los Angeles, San Francisco, Oakland and Seattle, has been appointed Pacific Coast representative of **The Bowlus Manufacturing Company,** Springfield, Ohio, manufacturer of boring machines.

Utility District Orders Two Pelton Turbines

An order has been placed with **The Pelton Water Wheel Company** by the East Bay Utility District, Oakland, Calif., for two 10,000-hp. vertical reaction turbines for installation in the district's Pardee power house. This plant is at the base of the Pardee Dam on the Mokelumne River, and the power is being developed in conjunction with the Mokelumne water supply system for the East Bay cities.

The turbines are designed for operation under a variable head of from 250 ft. to 325 ft. They will be direct-connected to generators suppled by the General Electric Company.

Becomes Assistant Pacific Coast Manager—Announcement of the appointment of George Ashlock as assistant Pacific Coast manager has been made by **The Sharples Specialty Company of California.** Headquarters will be maintained at 686 Howard St. Mr. Ashlock formerly was connected with the San Francisco sales force of the U. S. Electrical Manufacturing Company, Los Angeles.

Factory Removed to Larger Quarters—Due to the increasing demand for its product, the **Rains Metallic Packing Company,** formerly of Missoula, Mont., has found it necessary to secure larger and more favorably located quarters and has removed its factory to 433-7 Havermale Ave., Spokane, according to announcement of Robert H. Rains, president and general manager.

Well Arranged Display of Wiring Devices

This attractive display appeared recently in the window of the **Levy Electric Company,** 1230 Polk St., San Francisco. The display featured the wiring devices of the Bryant Electric Company, including the Hemco line, and the Bryant Alabax line of lighting fixtures. At the right is shown the company's hospital signal system and at the left various types of panels, flush plates and receptacles. A group of Hemco products may be seen in the foreground.

Edison Electric Appliance Company Occupies New San Francisco Offices

Doubling the space occupied by its former offices, the Pacific Coast district sales office of the Edison Electric Appliance Company, Inc., on Sept. 1 established attractive new headquarters at 126 New Montgomery St., in the Rialto Bldg., San Francisco.

The arrangement of the new offices has been carefully planned to secure the maximum of efficiency. To the left of the entrance is a fine display of electric ranges manufactured by the company. These are so placed that they are directly behind a large plate glass window facing on Montgomery St., thus making an effective window display. Behind the ranges is the business office, flanked by the private office of R. W. Turnbull, Pacific Coast district manager.

Directly facing the entrance is the office of the factory branch service station, which is in charge of C. E. Allen, service station manager. In the rear is the shipping desk, work bench and stock cabinets for repair parts.

A feature of the office that immediately catches the eye of the customer is the large display cabinet at the extreme right which runs the length of the wall and is filled with glistening samples of all the small appliances made by the company. On the mezzanine floor is an exhibit of the company's line of apartment house ranges and ovens, and in the large basement are displayed the hotel equipment, ovens, ranges and other heavy-duty appliances.

Formal opening of the new quarters was held on Sept. 7, and all day long the place was filled with members of the electrical industry and others seeking to congratulate the Edison Electric Appliance Company on its new establishment.

Coast Representative Made District Manager

John H. Maddox, formerly Pacific Coast representative of the Duplex-a-Lite Division of **The Miller Company**, Meriden, Conn., wtih headquarters in Los Angeles, has been made district manager for the company with jurisdiction over the eleven Western states. Mr. Maddox will make his headquarters at 50 Hawthorne St., San Francisco, where **George A. Raab & Company**, the company's local distributors, have offices.

O. R. Forsberg will represent the company in southern California and Arizona, with headquarters in Los Angeles.

To Promote Radio As Load-Builder—C. W. Geiser has been appointed a special representative by the **Atwater-Kent Manufacturing Company** of Philadelphia to contact with electric light and power companies. In his new duties Mr. Geiser will co-operate with the present Atwater-Kent organization to promote radio as a load-builder on central station companies' lines and work out plans for co-operation with distributors and independent radio dealers.

Range Company Personnel Changes—Paul White, formerly in the Portland office of the **Estate Stove Company**, Hamilton, Ohio, has been transferred to the San Francisco office of the company. C. B. Maxfield, formerly with the Armstrong Range Company, has been appointed to succeed Mr. White in Portland. Sydney A. Beck is in charge of the company's activities in the Northwest, and Jack Davidson in California.

Mazda Lamps in Toy Houses

Based on the theory that an attractive container will increase the sale of lamps by the carton, the Mazda Lamp Divisions of the General Electric Company—**The National Lamp Works**, Nela Park, Cleveland, and the **Edison**

Lamp Works, Harrison, N. J.—have introduced the "house carton," which has the appearance of a toy house.

It is constructed of durable patent coated carton stock and is handsomely lithographed in three colors. Three different designs, each representing the exterior of an attractive house and expressing the Colonial, Spanish and English types of architecture, are available.

Hum of Airplane Turns on Landing Field Lights

A sound-sensitive lighting agency developed by T. Spooner, research engineer for the **Westinghouse Electric & Manufacturing Company**, was a nightly feature of the National Air Races and Aeronautical Exposition held in Los Angeles Sept. 8-16.

The function of the new device, already tried out with great success on Eastern landing fields, is to use the drone of an airplane to control electrical energy. An aviator arriving after dark at an airport equipped with this device will find that landing lights are turned on automatically by the sound of his plane's propeller.

Opens San Francisco Office—Announcement has been made by **The Lincoln Electric Company**, Cleveland, that it has opened an office in San Francisco at 533 Market St., in charge of W. S. Stewart. A complete stock of "Linc-Weld" motors and "Stable-Arc" welders and arc welding supplies is being carried.

Denver Firm Incorporates—**The H. M. Olmstead Electric Company**, Denver, recently has been incorporated. It is now occupying its new location at 65 South Broadway.

Takes Larger Quarters—**Arthur E. Bacon & Company**, Denver, have removed to more spacious quarters at 912 Twentieth St.

New Equipment

Air Heaters

A line of electric air heaters is being manufactured by the **Weir Electric Appliance Company**, 2528 Adeline St., Oakland, Calif.

The line includes several portable heater models, including the DeLuxe

model of light oxidized bronze shown in the illustration, a fireplace log heater and a bathroom heater. All the heaters are equipped with three-heat reciprocating switch. Heating coils are made of the best grade nickel chromium wire, machine wound, and can be changed without interfering with any other part of the heater, the manufacturer states. The brick or heating element is of special composition, and has greater radiating surface than any other heater. It requires no reflector, the heat being radiated outward by the brick itself. When heated, the brick draws cold air through the channels, creating forced circulation.

Specifications of the standard portable heater are: Height 18⅛ in:; length 20¼ in.; depth 9⅝ in.; shipping weight 48 lb.; standard heavy portable: Height 18⅛ in.; length 37⅜ in.; depth 9⅝ in.; shipping weight 80 lb.—Electrical West, October, 1928.

Cabinet Type Ventilator

A cabinet ventilator especially designed for installation within new homes, apartments and apartment hotels for kitchen ventilation has been added to its line by the **Autovent Fan & Blower Company**, 1805-1827 North Kostner Ave., Chicago. These cabinet ventilators also may be installed for ventilation of lounging or smoking dens and of basement laundries within residences.

All mechanism has been reduced to extreme simplicity, the manufacturer states. All control mechanism is directly connected to the control handle. A one-half turn of the control handle mechanically opens the louvers and also opens the glass door and starts the fan motor. To stop the unit it is only necessary to turn the control handle to former position, which mechanically turns off the electric current to motor, stops the fan, closes and locks the louvers and closes and locks the glass panel door, making the entire ventilator positively weatherproof.—Electrical West, October, 1928.

A.C. Automatic Starter

A new series of a.c. automatic starters recently has been introduced by the **Industrial Controller Company**, Milwaukee, known as Classes 8526 and 8536 (50-amp. size).

This starter which, according to the manufacturer, can be classed as an advanced design in automatic control, will supersede the Classes 8527 and 8537. Some of the features incorporated in this new apparatus are: new type quick detachable contact fingers; extra heavy magnet coil which provides unusual sealing pressure; floating armature which eliminates magnetic hum; self-aligning bearing bronze bushings which reduce wear and insure longer life; powerful magnetic blowouts which reduce arcing to a minimum; a new form of interlock which permits replacement of contacts; plenty of wiring space, thus easy to install; baked

enamel finish, making a good appearance; three types—push button in cover, without push button, three-point switch in cover.—Electrical West, October, 1928.

Combination Switch Outlet and Signal Light

A combination switch-tap and pilot light in a duplex plate is being placed on the market by **Harvey Hubbell, Inc.**, Bridgeport, Conn.

In one unit is combined a switch, an outlet and a signal light. A two-gang box takes the whole device, thus effecting a worth-while saving, and the device may be substituted for existing two-gang installations, the manufacturer states. The device is adaptable for appliances, radio and remote control of lights.—Electrical West, October, 1928.

Totally Enclosed Motor

A new line of totally enclosed, fan-cooled motors, 1 to 50 hp., has been developed by the **Allis-Chalmers Manufacturing Company**, Milwaukee. The following quotation is from the manufacturer's description of the new motor:

"In this new design, all of the active parts, such as stator core, stator winding and the rotor, are completely enclosed, preventing contact of outside

air, dirt, dust, fumes and moisture with the interior or active parts. Heat is carried away by a sufficient volume of cooling air forced around and across those parts which conduct the heat from the interior to the outer surfaces. A circumferential air jacket controls the path of cooling air. Solid cast iron bearing housings are attached to stator end heads with machined fit which, with grease packed bearings, form a perfect end closure. Internal parts of motor are readily accessible by removal of housings. A unique feature is that in many ratings this totally enclosed design delivers the same horsepower output as is obtained from the same frame in the standard open rating. Temperature rise is within 55 deg. C. measured by the resistance method. The design provides for a most rugged construction with a minimum number of parts."—Electrical West, October, 1928.

Unit Substation

A new design of substation which in one unit combines a power transformer, switching facilities, over-load and short circuit protection, and means of metering, has been placed on the market by the **Condit Electrical Manufacturing Corporation**, Boston.

A standard three-phase star-connected primary power transformer of the usual design is used, except that it is arranged to allow inserting an oil circuit breaker in the connection between the primary winding and the common or star connection point. The whole structure makes a compact, complete unit substation, resulting in great economy of equipment and installation cost combined with ease of operation and maintenance, the maker states.—Electrical West, October, 1928.

Electrically Heated Steam Table

Specializing in the manufacture of electrically heated steam tables, the **Appliance Manufacturing Company,** Nashville, Tenn., offers a line of various models under the trade name "Lectric Mack."

Some of the advantages of the "Lectric Mack" steam tables, as listed by the manufacturer, are: They are porcelain enameled inside and out, thus making them sanitary and easy to keep clean; the cabinet or shelves underneath may be used for storing and warming dishes; the water compartment is insulated with ½-in. asbestos and dead air spaces so that it operates on a small amount of electricity and holds heat for several hours after the current is shut off; no special wiring is necessary; the top, which is provided with holes to receive the food containers, is in one piece and removable, and these tops are furnished in three different styles to accommodate various assortments of food containers; two or more "Lectric Mack" units may be

joined together to make a uniform steam table of any desired size and shape; the steam table quickly may be converted into a salad cooler for serving cold lunches simply by draining out the hot water and replacing it with cracked ice.—Electrical West, October, 1928.

Outdoor Meter Box

A new type of meter box, which makes it possible to mount residential meters out of doors for easy reading, is announced by the **Square D Company,** Detroit.

The case, finished in clear enamel, is of 16-gage steel, electrically welded, with double strength window glass cemented in. The assembly includes a 60-amp. test block, a sealing stud at the bottom of the box, and a meter board of wood which permits the mounting of meters with differently spaced mounting holes. Two heavy steel strips are welded to the back of the box, offset to hold it away from the wall. The distribution fuse box and service entrance switch are installed in the basement. Service is brought from the pole directly to the meter box, which is mounted at the most convenient location on the outside wall of the house. The meter itself is perfectly protected, as the box is moisture-proof, yet it is always accessible to service men. The meter can be instantly read through the glass panel, or tested, set or removed when desired.—Electrical West, October, 1928.

Grounding Wire Connection Clamp

Recent announcement of the development of a simple and effective grounding wire clamp has been made by the **Copperweld Steel Company,** Glassport, Pa. This clamp, listed as standard by Underwriters Laboratories, is designed to encircle the ground rod and securely bind the grounding wire directly to the driven member.

With this method no solder or heat is required, it merely being necessary to pass the grounding wire into the clamp which has been placed around the driven rod, then tighten by means of a set screw actuated by a set-screw wrench. So securely does this simple little device clamp the wire to the driven member that, it is asserted, the wire is flattened against the rod thus increasing its contact surface and eliminating the possibility of slippage.—Electrical West, October, 1928.

Colored Kitchen Lights

In step with the modern demand for color in the kitchen, **The F. W. Wakefield Brass Company,** Vermilion, Ohio, is offering a series of vividly decorated kitchen lights in red, green and blue. The globes carry attractive informal designs in bright colors to harmonize with the fixtures.

The units are packed complete with glassware, wired and supplied with approved connectors, with the thought in mind that many dealers will handle them not in their fixture departments, but as merchandise which can be sold over the counter.—Electrical West, October, 1928.

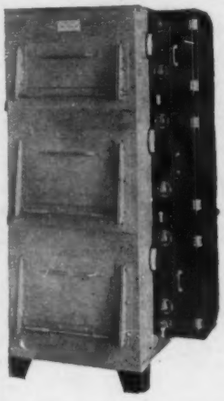
Sockets—A line of sockets to accommodate the new intermediate base lamp has been brought out recently by the merchandise department of the **General Electric Company,** Bridgeport, Conn. This line comprises nine different styles of lampholders and a screw base adapter, the lampholders including designs for candle effects, electric signs, and weatherproof decorative strings.—Electrical West, October, 1928.

Washing Machine in Two-Color Finish—The A B C double A model electric washer manufactured by **Altorfer Bros. Company,** Peoria, Ill., has a finish of parchment tan and sea green.—Electrical West, October, 1928.

"Ad-a-Deck Oven"

Complying with many requests for a small size oven, the **Edison Electric Appliance Company, Inc.,** 5600 West Taylor St., Chicago, has developed a new "Ad-a-Deck" sectional type which will be a permanent addition to its line.

Each section is an individual baking or roasting compartment which is steam



tight and separately insulated. Its construction permits of the greatest diversity of baking in the different compartments of an oven simultaneously, the manufacturer states. Each baking chamber is equipped with upper and lower heating units, each unit being individually controlled by a three-heat reversible type rotary snap switch and protected by a double pole cut-out. Ovens of this design are equipped with a standard Edison one-piece deck 1½ in. thick. This deck is always perfectly smooth and level and permits storage of heat which enables economical operating. Both deck and units are readily removable through the door opening.

These ovens may be obtained in various capacities and combinations. They are fully described in Catalog Supplement, Form No. 722, which may be obtained upon request from the company.—Electrical West, October, 1928.

Wide Spread Light

The Wide Spread Light for general outdoor use, 200-watt clear lamp, has been announced by the **Holophane Company,** 342 Madison Ave., New York City.

This new light has been especially designed to light outdoor areas, and spreads the light out uniformly over wide areas instead of confining it directly under the light as ordinary reflectors do. The light is weatherproof and dustproof and is recommended for factory entrances, outside of buildings, over doors, watchman's circuit lighting, roadways, shipping platforms, warehouses, watchman's gate, outdoor parking space, indoor parking space, gasoline filling stations and country club driveways.—Electrical West, October, 1928.

Plural Sockets

Two types of plural sockets have been announced by the **Beaver Manufacturing Company, Inc.**, 625-645 North Third St., Newark, N. J.

Both sockets are encased in a brown

covering marked genuine bakelite, the design is small and of pleasing lines, and the interior construction is sturdy and strong, according to the manufac-

turer's announcement. Both are packed ten to a counter display carton. The angle-type socket retails at 40 cents and the other at 35 cents each.—Electrical West, October, 1928.

New Frigidaire

A new Frigidaire, presented in three distinct lines and nineteen models with a wider price range, has been announced by **General Motors Coroporation.**

As described by the maker, it is ultra quiet in operation, higher in efficiency and considerably changed in appearance. Louvers have been eliminated from the base of the cabinet, thus removing the last trace of the mechanical from its general appearance. Heat taken from the food storage compartment is now expelled through the rear of the cabinet. The lower front becomes a broad, unbroken panel which perfectly fits into the symmetrical lines of the cabinet itself. A forced draft playing upon the condenser instantly drives heat which has been removed from the food storage compartment into the open air. Two fans, operating in opposite directions, set up an air current which provides a positive method of heat removal.

The new Frigidaire models are equipped with a ¼-hp. Model "A" compressor and a 1/6-hp. Model "E" compressor. They supplant the "S" and "G" compressors, both ¼ hp., with which preceding models were equipped. —Electrical West, October, 1928.

Recent Publications

Airport Illumination—This is the subject of Bulletin GEA-982 of the **General Electric Company**, Schenectady, N. Y. Views of lighted airports are shown, and description given of rotating beacons, boundary lights, 180-deg. floodlights, airport twin floodlights, ceiling lights, wind cone lights, air marking signs, transformers, wire and cable, control, battery chargers, and wiring devices. There is also a table of the Mazda lamps for the various beacons and lights, with dimensions and hours of life.

Simplex Electric Appliances—The Simplex Division of the **Edison Electric Appliance Company, Inc.**, 5600 West Taylor St., Chicago, has issued Catalog H420 covering its line of electric appliances, and two leaflets, one on the Simplex Sunbowl heater and the other on the Simplex heating pad. The Simplex Division of the Edison company was formerly the Simplex Electric Heating Company.

Combination Panel Board—Bulletin L 20367, a recent publication of the **Westinghouse Electric & Manufacturing Company**, East Pittsburgh, describes Type CLP combination light and power panel board. This panel board is to be used for installation in residences, apartments or other places where power and light circuits formerly required switching equipment which was space-consuming and unattractive.

New Lionel Catalog—A 46-page booklet covering its entire new 1928 line of electric trains and model railroad accessories is being distributed by the **Lionel Corporation**, 48 East 21st St., New York City. This booklet is intended for distribution to boys and girls answering Lionel advertising in general publications, and children and their parents who appear to be first-class prospects of dealers, the manufacturer states.

High Tension Bus—Under the title, "The High Tension Bus, Its Design and Construction," by A. B. Dibner, E.E., catalog No. 29 is being distributed by the **Burndy Engineering Company, Inc.**, 10 East 43rd St., New York. The booklet, which is in two sections, I—"General Notes on Construction," and II—"Catalog of Bus Connectors," contains numerous illustrations.

Oil Switches and Circuit Breakers—This is the title of Bulletin No. 478, describing oil switches and circuit breakers, types D-117 and D-127, manufactured by the **Condit Electrical Manufacturing Corporation**, Boston.

Electric Trains and Equipment—A new catalog describing in detail toy electric trains and equipment manufactured by **The American Flyer Manufacturing Company**, 2219 South Halsted St., Chicago, is now being distributed by that company. The line includes, in addition to trains and locomotives, bridges, tunnels, stations, automatic signals and stationary railroad equipment models. A feature of the catalog is the reproduction in colors of the colored merchandise handled by the company.

Industrial Lighting—A comprehensive illustrated "Guide to Productive Lighting for Industry" has been published by the **Bejamin Electric Manufacturing Company**, Chicago. Through charts and specifications a simple method is developed for the planning, layout and installation of an effective lighting system. "Light and Production," published by the same company, deals with the definite relation between light and productive efficiency.

Radio Standards Handbook—Nearly 450 radio standards are defined in the fourth edition of the Handbook of Radio Standards published by the National Electrical Manufacturers Association, 420 Lexington Ave., New York. This is an increase of nearly 50 over the number of standards contained in the third edition of this handbook which was brought out last year. The fourth edition contains 106 general standards, 97 transmitter standards, 121 receiver standards, 64 on power supply and 60 on vacuum tubes. There is also a listing of more than 700 subjects in a cross-referenced index. The handbook includes a number of tables and curves giving useful data on general purpose and audio output tubes.— Price $2.

Traffic Signals—"Be Careful" is the significant title of Bulletin 2113 recently issued by **Crouse-Hinds Company**, Syracuse, N. Y. It deals with the electric traffic signals manufactured by the company for the regulation of traffic at intersections, particularly adjacent to school buildings, and contains plan views of representative conditions encounted, with the signals best suited for each location. A cover showing children starting for school and a double-page picture of school children crossing a wet street, both in color, add to the attractiveness of the pamphlet. The company offers the advice of its engineers to anyone struggling with the problem of regulation of school traffic.

Steam Tables—This book, published by **The Superheater Company**, 17 East 42nd St., New York, and Peoples Gas Building, Chicago, contains steam tables of the properties of saturated and superheated steam from 0.0886 to 3,300 lb., absolute pressure.

ELECTRICAL WEST Barometer of Industrial Activity in Western States

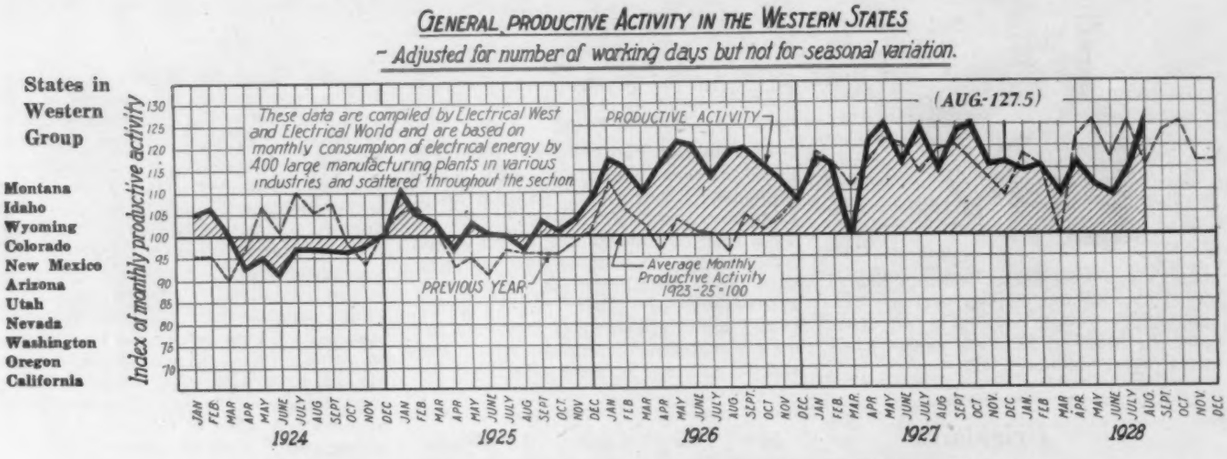
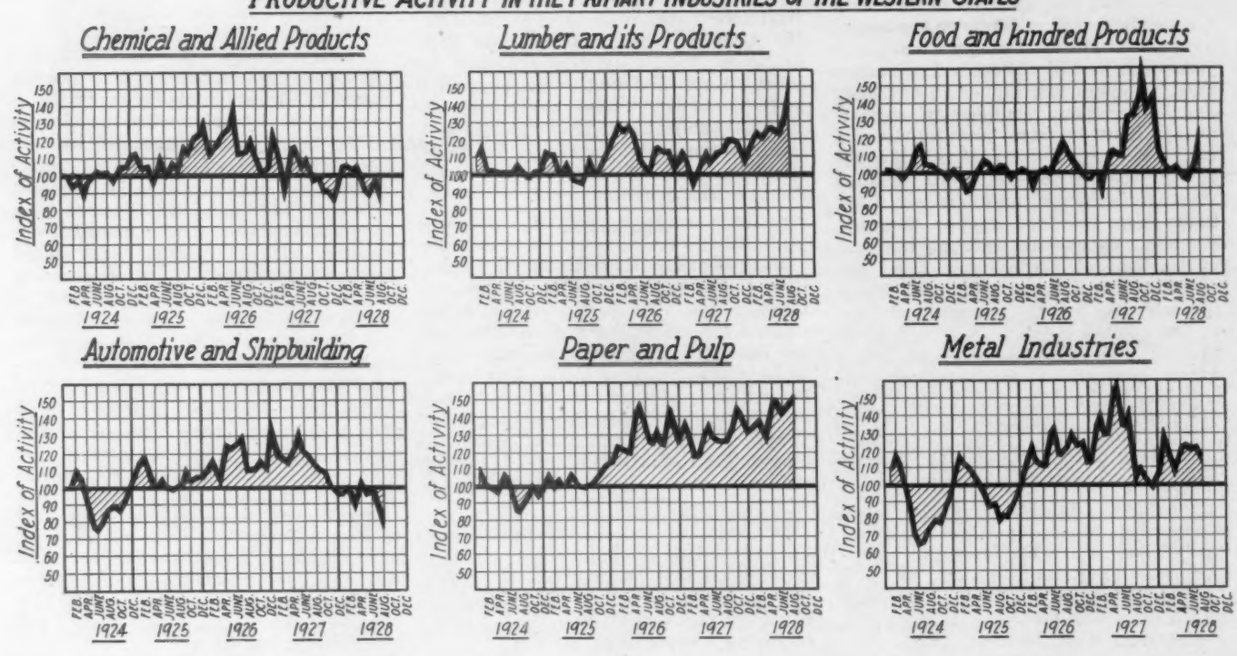
Reports received on the consumption of electrical energy by the manufacturing plants of the Western states indicate that August witnessed a material increase in the rate of productive operations in these plants. August rate of operations, after corrections are made for the number of working days, was 9.4 per cent over those reported for July, and was 10.5 per cent over August last year.

It appears that the low point of manufacturing activity during the current year was recorded in May, since which month there has been an almost steady increase in manufacturing activity in the section. The rate of activity attained in August was the highest ever attained by the industries of the Western states. It appears that the West is just reacting to the record operations which have been prevalent in general industry in the East during the past summer.

Varying tendencies are being witnessed among the industrial groups of the Western states. Lumber, the backbone of Western industrial operations outside of agriculture, reported a material increase in the rate of operations, the August operations being by far the highest ever witnessed by the industry, and 37.7 per cent over August last year. The average rate of production in the lumber industry during the first eight months of the year was 19.5 per cent over that during the same period last year. The paper and pulp industry also reported record operations, current August operations exceeding those of August last year by 19.2 per cent. The rubber products industry shows the unusual increase of 56.2 per cent over August last year.

On the other hand, the food products industry, in spite of a gain over July of 15.5 per cent, was still operating on a plane some 7 per cent under August last year.

Indexes of Industrial Activity in the Western States

(All figures adjusted for number of working days.)

	Aug. 1928	July 1928	Aug. 1927	Av. for 1st 8 mo. 1928	Av. for 1st 8 mo. 1927
All industry	127.5	116.5	115.3	116.9	117.7
Chemicals and allied products	84.4	92.3	96.8	97.2	109.8
Food and kindred products	125.1	108.3	134.5	108.1	110.2
Lumber and its products	158.7	135.8	115.2	130.9	109.5
Metals group	118.0	123.4	99.6	122.6	138.2
Paper and pulp	151.7	147.5	127.2	143.9	130.3
Rubber and its products	173.2	160.0	111.0	149.7	
Shipbuilding	75.6	75.6	106.2	90.9	120.6
Stone, clay and glass	129.8	111.5	142.3	145.6